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HANDBOOK
FOR THE
12-PR. B.L. 6 CWT. GUN
(MARKS I-IV.)
AND
CARRIAGES, MARKS I* & II.
(HORSE ARTILLERY.)
1901.

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(V.120, 1901)

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HANDBOOK

FOR THE

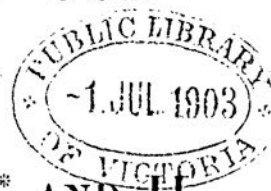
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1901.



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CONTENTS.

	PAGE
Description of Guns and Fittings	3
" Sighting	7
Instructions for Care of Tangent Sights	8
Care and Preservation of Guns and Fittings	13
Description of Carriages	14
" Limbers (Carriage and Ammunition Wagon)	17
" Ammunition Wagons	18
" Forge Wagons and Limbers	20
" Store Wagons and Limbers	22
" Ammunition and Store Wagons, R.A.	24
Care and Preservation of Carriages, &c.	26
Description of Cartridges	27
" Projectiles	28
" Fuze	29
" Tubes	31
Range Tables	33
Section Gun Drill	37
Mounting and Dismounting Gun, Carriage, &c.	52
Method of Drilling Recruits	55
List of stores carried (Carriages, Limbers and Ammunition Wagons)	57
" Strapping	64

DIAGRAMS OF PACKING.

Carriages, Limbers and Ammunition Wagons. .	A and B
Forge Wagons and Limbers	C
Store	D and E

PLATES.

Guns	I, II.
Breech Mechanism	III, IV.
Sighting	V, VI.
Carriages	VII, VIII.
Limbers	IX, X.
Ammunition Wagons	XI, XII.
Spare pole, position under Wagon	XIII.
Wagon, Ammunition and Store, R.A.	XIV.
Cartridge	XV.
Shrapnel Shell	XVI, XVII.
Case Shot	XVIII.
Fuze, T. and P., No. 56, Mark IV	XIX.
Tubes, T, friction (Service and Drill)	XX.
Forge Wagon and Limber	XXI.
Store Wagons and Limber { Mark I	XXII.
" II	XXIII.

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HANDBOOK for the 12-pr. B.L. 6-cwt. GUN (Marks I-IV), 1901.

CORRECTIONS IN DRILL.

Page 37, line 15 from top.—*After* word “rear,” *insert* “or the order of march, as may be ordered.”

Line 23 from top.—*Insert* following lines:—

“Position of the order of march.”

“To form the order of march from detachment rear.”

“To form detachment rear from the order of march.”

Page 38, line 5 from top.—*Dele* “numbers,” and *substitute* “men.”

Line 22 from top.—*Dele* “numbers,” and *substitute* “remainder.”

Line 23 from top.—*Dele* “each halting as he reaches his place,” and *substitute* “by the shortest way and halt.”

Line 27 from top.—*Dele* “numbers,” *substitute* “remainder.”

Page 38, *after* line 15 from bottom, *insert*:—

“*Position of the Order of March.*”

1 on his horse.—At dismounted drill he will place himself 2 yards from the point of the pole on near side.

2 and **3** in line with axle of gun limber.

4 and **5** in line with axle of gun carriage.

6 and **7** in line with axle of wagon limber.

8 and **9** in line with axle of wagon body.

Even numbers on the near side, odd on the off.

“*To Form the Order of March from Detachment Rear.*”

Section Commander.

No. **1.**

....Section—*Form the order of march.*

No....Double march.

At the order from the section commander, **1** doubles to his place and gives the order “Double March.”

At the order from **1**, the remainder double to their places by the shortest way and halt.

“*To form Detachment Rear from the Order of March.*”

Section Commander.

No. **1.**

....Section—*Detachment rear.*

No....Double march.

At the order from the section commander, **1** doubles to his place and gives the order “Double March.”

At the order from **1**, the remainder double to their places by the shortest way and halt.

Page 40, line 13 from top.—*Dele* “tension link,” *substitute* “stay.”

Line 16 from top.—*Dele* “tensile.”

Line 6 from bottom.—*Dele* “base of the hood,” *substitute* “breech bush.”

Page 41, lines 1, 4, and 7 from bottom.—*Dele* “tray,” and *substitute* “carrier.”

Page 42, lines 9, 11, and 17 from bottom.—*Dele* “shell pocket” *substitute* “axletree box.”

After line 6 from bottom, *insert* “when the portable magazine is empty he will leave the lid open as a signal to 6 to bring up a fresh one.”

Page 43.—*Dele* lines 16, 17, 18, and 19 from bottom.

Page 44, lines 12, 14, 16, 18, and 21 from bottom.—*Dele* “tray,” or “trays,” *substitute* “carrier” or “carriers.”

Dele lines 9, 10, and 11 from bottom.

Page 46, line 14 from top.—*Dele* “to,” “front,” and “tight,” and *for* “front,” *substitute* “gun.”

Line 15 from top.—*Dele from* “the forearm” *to* “the vent.”

Line 20 from top.—*Dele* “slews his body to the right, and thus.”

Line 21 from top.—*After* “gun,” *insert* “by jerking the lanyard smartly.”

Page 47, line 2 from top.—*After* “right hand,” *insert* “when using telescopic sights 3 must remove the sight before stepping clear.”

Line 15 from top.—*Dele* “shrapnel.”

Line 16 from top.—*For* † *substitute* ‡.

Page 48, line 2 from top.—*After* “chamber,” *insert* “and supply himself with a fresh round from the carrier, placing the cartridge under his left arm.”

Line 22 from top.—*After* “3” *insert* “lays.”

Line 25 from top.—*Dele* “trays,” *substitute* “carriers.”

Page 50, line 3 from top.—*After* “brake,” *insert* “and replaces the lanyard.”

Line 5 from top.—*After* “lanyard,” *insert* “lowers his sight.”

Last line on page.—*Dele* “trays,” *substitute* “carriers.”

Page 51, line 18 from bottom.—*For* “posts are,” *read* “post is.”

[N.B.—This Handbook is corrected up to April, 1901. Any alterations which may be suggested should be forwarded direct to Chief Inspector, Royal Arsenal, Woolwich.]

ORDNANCE, B.L., 12-PR., 6 CWT. (MARKS I-IV).

(PLATES I AND II.)

DESCRIPTION.

PUBLIC LIBRARY, ASTOR LENOX TILDEN FOUNDATION

Material	Steel (wire construction.)
Weight	{	Mark I gun	{ with fittings	..	..	6 cwt. 1 qrs. 18 lbs.
		" II "	{ breech fittings	..	..	— 1 " 1 "
		" III "	{ with fittings	..	..	6 cwt. 1 " 26 "
		" IV "	{ " "	..	..	6 " 0 " 0 "
		Marks II-IV guns, breech fittings	..	..	..	5 " 3 " 12 "
Length	{	Mark I gun	..	..	..	— 1 " 17 "
		" II "	..	..	..	66.75 inches
		Marks III and IV guns	..	..	..	64.35 "
Bore	{	calibre	..	..	..	71.05 "
		length	{ Mark I gun	..	..	3 inches
		" II "	..	..	..	59 "
Chamber	{	diameter	Marks III and IV guns	..	..	59.3 "
			Mark I gun	..	..	66 "
		length	Marks II-IV { largest	..	..	3.2 "
			guns { smallest	..	..	3.35 "
		system	Mark I gun	..	..	3.2 "
Rifling	{	length	Marks II and III guns	..	..	9.05 "
			Mark IV gun	..	..	9.8 "
			Marks I, II and IV guns	..	..	7.8 "
			Mark III gun	..	..	Polygroove, hook section
				..	..	" modified plain section
		twist	Mark I gun	..	..	49.25 inches
			" II "	..	..	48.3 "
			" III "	..	..	55 "
			" IV "	..	..	56.8 "
			Marks I and II guns	..	..	Increasing from 1 turn in 105 calibres at breech end of rifling to 1 in 28 at 15 inches from the muzzle, remainder uniform 1 turn in 28 calibres.
		grooves	Mark III gun	..	..	Increasing from 1 turn in 100 calibres at breech to 1 turn in 35 calibres at muzzle.
			Mark IV gun	..	..	Increasing from 1 turn in 120 calibres at breech to 1 turn in 28 calibres at muzzle.
			number	..	..	18
			depth	..	..	.04 of an inch
			width	Marks I, II and IV guns4 of an inch
				Mark III gun265 " "

NOTE.—Marks II and III guns when retubed on repair will have the same chamber and rifling as Mark IV guns,

(7106)

A 2

Mark I Gun.

The gun is made of steel, and consists of the A tube, around which are wound successive layers of steel wire, extending over the chamber and a portion of the bore. The jacket with trunnions is fitted over the exterior of the wire and a portion of the A tube, and secured longitudinally by a shoulder on the A tube, and a steel breech bush screwed into the jacket at the rear. The breech bush is prepared for the reception of the breech screw, and furnished with lugs for the attachment of the breech fittings and elevating mechanism; the rear portion of the bush also forms a hood for the protection of the fittings. The B hoop is shrunk round the A tube immediately in front of the jacket, by which it is partially overlapped.

The chamber is cylindrical, slightly coned at the entrance, and terminating in front with a curved slope.

On a certain number* of guns, a plane for clinometer is prepared on the exterior of the jacket at the breech, but no more will be so prepared.

Mark II Gun.

The gun is of steel and consists of the A tube around which are wound successive layers of steel wire extending over the chamber and a portion of the bore. The jacket with trunnions is fitted over the exterior of the wire and a portion of the A tube. A steel bush is screwed into the rear end of the A tube forming a seating for the obturator. The jacket and A tube are secured longitudinally by a shoulder on the A tube and a steel breech bush screwed into the jacket at the rear; the breech bush is prepared for the reception of the breech screw. Over the rear end of the jacket is shrunk the breech ring, which is provided with lugs for the attachment of the breech fittings and elevating gear. The B hoop is shrunk round the A tube immediately in front of the jacket.

Mark III Gun.

The gun is of steel and consists of the A tube around which are wound successive layers of steel wire extending over the chamber and a portion of the bore. The jacket with trunnions is fitted over the exterior of the wire and the A tube, and secured longitudinally by shoulders on the A tube and a steel breech bush screwed into the jacket at the rear. The breech bush is prepared for the reception of the breech screw.

Mark IV Gun.

The gun is of steel, and consists of the A tube around which are wound successive layers of steel wire extending over the chamber and a portion of the bore. The jacket with trunnions is fitted over the exterior of the wire and a portion of the A tube, and secured longitudinally by shoulders on the A tube and a steel breech bush screwed into the jacket at the rear; the breech bush is prepared for the reception of the breech screw. Over the rear end of the jacket is

* Nos. 4, 5, 6, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25 and 28 only have the clinometer plane.

shrunk the breech ring, which is provided with lugs for the attachment of the breech fittings and elevating gear. The B hoop, which carries the fore sight, is shrunk round the A tube immediately in front of the jacket.

Marks II-IV Guns.

The entire portion of the chamber is cylindrical, reduced in diameter with a curved slope in front and coned at the rear.

A plane for clinometer is prepared on the upper surface of the jacket.

Axis lines are formed on the vertical and horizontal axes of the gun at the muzzle.

Breech-closing mechanism.

MARK I GUN.

(Plate III.)

The breech is closed by a parallel screw having three portions of the screw thread removed longitudinally, each one-sixth of the circumference. The interior of the gun at the breech being prepared in a similar manner, admits of the screw, when the raised portions are placed opposite the smooth surfaces in the gun, being pushed home, and locked by the sixth of a turn.

The breech screw has hinged to it a cam lever, by means of which it is locked and unlocked; the cam portion of the lever (when the breech-screw is locked) falls into a recess in the carrier ring, and so prevents any movement of the breech screw during firing. In lowering the cam lever, after the breech screw is unlocked, the cam acting upon the surface of the carrier ring, starts the first movement to the rear of the breech screw and obturator.

Encircling the rear end of the breech screw, and hinged to the hood, is a carrier ring, which supports the screw when withdrawn.

The carrier ring is held to the gun during the withdrawal of the breech screw, by means of a clip fitted to the left side of the ring, engaging with a recess in the hood.

A stop bolt in the right side of the carrier ring serves to prevent the breech screw being disengaged from the carrier ring when withdrawn; at the same time, the clip in the left side of the carrier ring is disengaged from the recess in the hood by means of a spiral spring, which forces the opposite end of the clip into a recess in the breech screw, thus securing the latter in the carrier ring. When in this position, the whole can be swung clear of the breech opening to admit of loading.

If, when opening the breech, the carrier ring remains fast, owing to the "clip retaining" not working properly, the latter can be pushed back by inserting the punch end of the breech mechanism wrench, in the hole provided for this purpose, on the left side of the breech.

Marks II-IV Guns.

(Plate IV.)

The breech is closed by a parallel screw ("Welin" system), which differs from the interrupted screw used with B.L. guns generally, in having a larger amount of thread in proportion to its length, by arranging segments at varying diameters, the breech opening of the

gun being prepared in a corresponding manner. The interruptions in the gun are arranged to accommodate the segments of the screw of largest diameter, thus, when the screw is unlocked these segments pass into the interruptions, and the segments next smaller in diameter unlock into the spaces left vacant by the larger ones.

A carrier for supporting the breech screw is hinged by a bolt to the right side of the gun at the breech, the breech screw being attached to the carrier by means of corresponding interrupted screw threads, and by a steel vent passing through the centre of the breech screw. The vent has a mushroom head at the inner end behind which the obturator is placed. The vent is retained in position by means of a sleeve, spiral spring, and nut, in the carrier. The carrier is furnished with a breech mechanism lever, pinion, and link, by means of which the breech screw is worked.

A catch fitted to the carrier engages with a corresponding recess in the rear face of the breech screw, when the breech is open, and retains the screw in the unlocked position. The catch is automatically disengaged from the screw in closing the breech.

A catch fitted to the breech mechanism lever engages with a corresponding recess in the left lug for elevating bolt, and retains the lever in the closed position.

Obturator.

MARK I-IV GUNS.

The system of obturation consists of a circular pad, with protecting discs fitting the mouth of the chamber, being placed between the mushroom head of the axial "T" vent and the inner face of the breech screw.

The pad being slightly elastic, expands radially when compressed by the action of the gas generated by the fired charge, thus completing obturation.

To prevent play, owing to slightly varying dimensions of the pads, and their becoming compressed by firing, thin adjusting discs of steel are placed between the rear protecting disc and the face of the breech screw.

Firing Mechanism

MARK I GUN.

The firing mechanism is designed for friction firing, with "T" friction tubes.

It consists of a steel axial "T" vent, passing through the centre of the breech screw, having secured to its outer end a head for the reception of the "T" friction tube. The axial "T" vent is retained in position by means of a spring catch in the breech screw. Fitted to the outer face of the breech screw and encircling the head of the axial "T" vent is an actuating collar, worked by the cam lever, by means of which the "T" tube is automatically turned into the firing position, and the vent sealed when the cam lever is lowered. The "T" tube is automatically released from the vent and turned into the position for withdrawing when the cam lever is raised, the tube being withdrawn by hand.

A "T" vent rimer is provided for clearing the taper portion of the vent channel in the "T" vent, in the event of it getting choked, so as to admit of the insertion of the tube.

MARK II-IV GUNS.

The firing mechanism is designed for friction firing with "T" friction tubes, and is so arranged that the gun cannot be fired before the breech is closed, and the breech mechanism lever home.

A steel box in which the "block retaining tube" slides is secured to the outer end of the vent, the retaining block being pushed into a position over the vent by means of a cam groove on the link when the breech is closed. A safety shutter on the left side of the slide box serves to prevent the lanyard being hooked on to the "T" friction tube in the vent before the breech mechanism lever is home. An extractor for releasing the "T" friction tube from the vent is fitted to the slide box, and is actuated automatically by means of the retaining block in opening the breech.

The lanyard for firing the gun is pulled from the left side.

A "T" vent rimer is provided for clearing the taper portion of the vent channel in the "T" vent, in the event of it getting choked, so as to admit of the insertion of the tube.

Sighting.

MARK I GUN.

(Plate V.)

The gun is side sighted and provided with two rows of sights.

The tangent sights are of steel; the cross heads are furnished with screw deflection leaves, giving deflection to $1\frac{1}{2}$ degrees right and left, and having notches at the top and small eye holes underneath. The bars are triangular in section and are graduated on the rear face to 4,000 yards for a muzzle velocity of 1,553 ft. secs., and on the right face to 13 degrees. The sights fit into bronze sockets held by fixing screws, and are provided with movable clamps. The bronze sockets are set at an angle of 1 degree 30 minutes for correction for drift.

Spring bolts, passing through the sockets, enter recesses in the sight bars when at zero, and prevent their being shaken out when the gun is passing over rough ground. The bolt on the right side is moved by pushing in, and that on the left, by pulling out, so as to make the sights interchangeable.

The fore sights are of bronze, with circular apertures containing an aluminium blade projecting from the left side to the centre surmounted by a steel acorn point. The sights are interchangeable, and slide into grooves in front of the trunnions, being retained by spring studs, which are released by raising the catches.

The tangent sight is correctly set—

For elevation.—When no space can be seen between the line marking the graduation ordered and the top of the clamp, while the line is not covered by the clamp.

For deflection.—When the line marking the graduation ordered is exactly in continuation of the arrow head.

MARKS II-IV GUNS.

(Plate VI.)

The guns are side sighted with tangent and fore sights on the left side only.

The tangent sight is of steel; the cross head is provided with a notched deflection leaf and traversing screw, giving $1\frac{1}{2}$ degrees deflection right and left. The bar is rectangular in section graduated on the rear face to 11 degrees, reading to 10 minutes. The sight is

furnished with a bronze socket having a milled head, and a drum, engraved with a yard scale to 4,500 yards, and a pinion which gears with a corresponding rack on the front face of the sight bar. An indicating arrow engraved on the socket serves to facilitate reading the yard scale.

The sight is retained in position in the gun by means of a spring catch which engages with a recess formed in the socket for its reception.

The fore sight used with the Marks II and III guns is the same as that previously described for Mark I guns.

The fore sight used with the Mark IV gun consists of a steel stem surmounted by a steel acorn point. The sight slides into a groove prepared for its reception in a projection on the side of the jacket, and is secured in position by means of a spring catch.

The tangent sight is correctly set:—

For elevation: When the line on the drum, marking the graduation ordered, is exactly in continuation of the indicating arrow on the socket.

For deflection: When the line on the crosshead marking the graduation ordered is exactly in continuation of the indicating arrow on the deflection leaf.

Instructions for the Care of Tangent Sights (Grenfell).

The sight bar of the tangent sight, and the graduated drum must not on any account be removed from the socket, as if this is done they are very liable to be assembled incorrectly in relation to each other.

The sights are interchangeable only as a whole, and a sight bar must remain with the socket in which it is issued.

The stop screw at the bottom of the bar should be frequently inspected to see that it has not worked loose and be tightened up, if necessary. It must not be unscrewed on any account.

Telescopic Sight.

MARK I GUN.

The gun is fitted with a steel bracket for carrying the telescopic sight. The bracket is firmly attached to the face of the right trunnion by a dovetail and two fixing screws. A bronze adjusting screw is provided in the upper part of the bracket, to alter the position of the telescope, so as to correct for difference of level of the wheels. A leather cover for the bracket is provided, shaped to suit the bracket, and secured in position by a $\frac{3}{4}$ -in. strap.

Description and instructions for using, &c., are published in a separate handbook.

MARKS II AND IV GUNS

The guns are fitted with a steel bracket for carrying the telescopic sight, Mark II guns on the right trunnion, Mark IV guns on the left trunnion. The bracket is firmly attached by a dovetail and two fixing screws. A bronze adjusting screw is provided in the upper part of the bracket to alter the position of the telescope so as to correct for difference of level of the wheels. A leather cover for the bracket is provided, shaped to suit the bracket, and secured in position by a $\frac{3}{4}$ -in. strap.

Mark III guns are not at present fitted for telescopic sights.

Description and instructions for using, &c., are published in a separate handbook.

De Bange Obturator.

MARKS I-IV GUNS.

The obturator consists of an asbestos pad and pair of metal discs. The inner face of the breech screw is flat, and between it and the mushroom head of the axial "T" vent the pad and discs are arranged. The pad is made of asbestos, worked up with mutton suet to a proper consistency, and enclosed in a strong double canvas cover; it is reduced to shape and pressed in a hydraulic machine. The word "front" will be marked on the front of the pad, and the word "rear" on the rear part. The pad is enclosed between two tin discs, the outer angles of which are protected by steel rings. The words "front" and "rear" will be marked on the inner faces of the front and rear discs respectively. The gun is coned at the seat of the obturator when pushed home, and the obturator is provided with a corresponding taper to insure a good fit.

In putting the obturator on the vent, first place the front protecting disc with its rounded side fitting the back of the mushroom head, then the pad with that side to the front which is curved to fit the front disc, the stitched side being to the rear, then the rear protecting disc, and in placing this, its flat side and bronze ring with which it is bushed should be on the opposite side to the pad.

If correctly assembled, the whole should fit together compactly. Should there be any play between the obturator and the face of the breech screw, one or more adjusting discs are placed behind the protecting disc.

The pads issued on the breech screw with a gun have always been previously expanded in that gun, but the first time any other pad is used it should be with a full charge and projectile.

Action.

MARKS I-IV GUNS.

When the breech screw is pushed into the gun, the obturator enters the chamber with perfect ease; on turning the breech screw, the pad is pressed home into the coned seat in the gun by the travel of the screw. The bore is thus perfectly closed by a species of buffer in contact all round the circumference, while the mushroom head of the "T" vent receives the force of the gas on discharge. On firing the gun, the pressure acts on the mushroom head which compresses the pad against the breech screw, causing it to expand laterally; from symmetry of form and position, this expansion must be radial to the axis and equal in every direction, and is sufficient to prevent the escape of the gas. On the pressure being removed, elasticity comes into play, and the obturator can be withdrawn from the cone by a straight pull, which can be given as soon as the screw is unlocked.

The pads are almost indestructible, except perhaps from the wear of opening and closing the breech, but if the firing is rapid they may get softened by heat; in this case, the obturator should be changed, the pad being thrown into cold water for a time, when it will soon be restored to good condition again. Spare obturators are provided, and also steel adjusting discs, which should be inserted between the rear protecting disc and the face of the breech screw if the pad becomes compressed by firing, but in all cases the obturator should turn freely on the breech screw.

The outer canvas of the obturating pad should be free from rents;

small bruises, likely to be removed by the pressure of firing, are of no importance.

If the pad is not in good order, or there are too many adjusting discs behind the pad, stiffness in working the breech will probably result.

The obturating pad should be rubbed occasionally with Russian tallow, mixed with oil or some other suitable lubricant, and the pad with protecting discs should be carefully handled to prevent them being indented or bruised.

The obturator should be kept complete on the axial "T" vent in the gun, or in the bronze box provided for the purpose, as there is a tendency of the pad to swell in the direction of its axis, which might cause difficulty in adjusting it on the "T" vent.

To Remove the Breech Fittings.

MARK I GUN.

Before removing the fittings, the breech should be opened, the breech screw being swung into the loading position.

Obturator.

Press down the lever of the spring catch in the breech screw, the axial "T" vent can then be withdrawn from the front of the breech-screw, and the obturating pad and discs removed from the vent.

When the obturator is attached to the breech screw, the removal of the latter from the carrier ring should be done by two persons, as care is necessary to keep the "clip, retaining, carrier ring" withdrawn clear of the breech screw before drawing the latter back, to avoid damaging the obturating pad and discs. The obturator should, however, always be detached, when possible, from the breech screw before removing the latter from the carrier ring.

Breech Screw.

When the breech is open, the breech screw is held in the carrier ring by a stop bolt on the right, and by the retaining clip of the carrier ring on the left. By withdrawing the retaining clip from the breech screw and holding it back (by means of a screwdriver used as a lever), the breech screw can be moved forward and the stop bolt pushed out from behind; the breech screw can then be withdrawn from the carrier ring, the retaining clip being held back until the breech screw is clear of the ring.

Carrier Ring.

This is attached to the breech by a hinge bolt secured by a keep pin. When the latter is taken out, the hinge bolt can be removed by giving it a few taps underneath with a piece of wood.

Clip, Retaining, Carrier Ring.

This retaining clip is actuated by a spiral spring, and retained in the carrier ring by means of a set screw. On the removal of the set screw, the clip and spiral spring can be withdrawn from the ring.

Collar, Actuating, "T" Friction Tube.

To remove the actuating collar from the breech screw, the cam lever must be lowered; the lever of the spring catch must then be pressed down, and the actuating collar turned to the left; the collar can then be removed to the rear.

Spring, Catch, Breech Screw.

To remove the spring catch, it must be pressed outwards, by means of a piece of wood (used as a lever in the interior of the breech screw), until the axis pin of the lever is clear of the exterior of the breech screw. The axis pin can then be removed, by means of a screwdriver, and the lever and catch, with spiral spring, withdrawn from the breech screw.

Cam Lever.

The cam lever must be lowered and withdrawn to the left.

To Re-Assemble the Breech Fittings.

The converse of the above action takes place in re-assembling the fittings on the gun.

Care must be taken, when placing the axial "T" vent and obturating pad and discs in the breech screw, to see that the indicating arrows engraved on the mushroom head of the axial "T" vent and the front end of the breech screw correspond, as it is in that position only that the spring catch in the breech screw, for retaining the obturator, will engage with the recess for its reception in the axial "T" vent.

MARKS II-IV GUNS.

Before removing the fittings the breech should be opened, the breech screw being swung into the loading position.

Block, Retaining Tube.

Withdraw the guide bolt clear of the cam groove in the link, and remove the block by pressing it downwards.

Box, Slide.

Turn the slide box through a quarter of a circle (care being previously taken to see that the extractor is clear of the vent), and withdraw to the rear.

Vent, T, Axial and Obturator.

Unscrew the nut of the vent by means of the "B" wrench, and remove the nut and spiral spring from the rear, and the vent with obturator from the front end of the breech screw. The sleeve can then be withdrawn from the interior of the carrier to the rear.

Lever Breech Mechanism and Pinion, Link.

Remove the keep pin and nut from the breech mechanism lever stud, press in the catch retaining breech screw clear of the recess in the screw and turn the breech screw to the right until the link is clear of the breech mechanism lever, when the latter with the link pinion can be withdrawn.

Link and Screw, Breech.

Unscrew and remove the check screw and axis pin of the link from the carrier, then press in the catch retaining breech screw clear of the recess in the screw, and turn the breech screw to the right (care being taken to hold the link so as to prevent it fouling the carrier), until the corresponding interrupted screw threads of the breech screw and carrier are disengaged, when the breech screw and link can be withdrawn.

Catch Retaining Breech Screw.

On the removal of the breech screw, the catch with spring can be withdrawn from the carrier.

Carrier.

Remove the keep pin and collar from the hinge bolt, and withdraw the hinge bolt, when the carrier with bearing washer can be removed.

To Re-Assemble the Breech Fittings.

The converse of the above action takes place in re-assembling the fittings on the gun.

Link and Screw, Breech.

In assembling the breech screw and link on the carrier, care must be taken to allow a space of about $\frac{1}{16}$ of an inch between the faces of the breech screw and carrier in order to admit of the corresponding interrupted screw threads on the carrier and breech screw engaging when the latter is turned.

Lever, Breech Mechanism and Pinion, Link.

In assembling the breech mechanism lever and link pinion, the breech screw should be turned into the locked position on the carrier and the lever with link pinion placed on the stud, the lever being held at an angle of about 45 degrees with the rear face of the carrier. Great care must be taken in replacing these fittings, as if the pinion is not engaged correctly with the link, the breech mechanism will not work.

Vent T Axial, and Obturator.

First place the sleeve in the recess in the carrier for its reception, then insert the vent with obturator from the front (care being taken that the pad and discs are correctly assembled and placed on the vent, and that the feather on the latter is placed opposite the featherway in the sleeve), and replace the spring and nut at the rear.

Box, Slide.

Push the extractor into the loading position in the box slide before inserting the latter in the carrier.

Block, Retaining Tube.

The safety shutter on the box slide must be pushed forward as far as it will go before inserting the block.

NOTE.—When turning the breech screw the operator is supposed to be standing at the breech of the gun looking towards the muzzle.

CARE AND PRESERVATION OF 12-PR. 6 CWT. B.L. GUNS AND FITTINGS.

See also "Regulations for Magazines, and the Preservation of War Matériel."

The breech fittings should be kept clean and oiled or greased, and in good working order; all working surfaces must be well lubricated, the fittings being taken off sometimes for this purpose, especially after firing.

To lubricate the hinge bolt of the carrier or carrier ring without removing the fittings, the small screw on the top of the bolt should be removed and oil poured into the channel, taking care to replace the screw after oiling.

All fittings of the gun should be treated with care; violence and jerks should be avoided, and no unnecessary force should be employed.

The breech fittings should work easily, and be free from cracks and burrs. The latter can be removed by filing, but this must be done carefully so as not to permanently damage the fitting. Should a crack be observed in a breech fitting, it should be exchanged if possible.

The threads of the breech screw should be free from burrs; should the screw not work easily when the obturator has been detached, the defect may often be remedied by careful filing, but no portion of the thread should be cut away to remove a crack, &c.

The breech should be kept covered up, if possible, to prevent dust and grit getting into the interstices of the breech fittings, which might impede their easy working. A canvas cover is provided for this purpose.

The following is a list of the oil holes in the breech fittings of Marks II-IV Guns, which require to have the screws occasionally removed and oil poured into the channels, so as to lubricate the parts without removal of the fittings. Care must be taken to replace the screws immediately after oiling:—

Fitting to be Lubricated.	Position of Oil Holes.
Carrier, hinge-bolt	Top of hinge bolt
Breech mechanism lever, stud ..	Top of stud
Link, axis pin.. .. .	Upper side of carrier
Breech screw	Plain portion of breech screw

In addition to the above, the stud for link on outer face of breech screw should be lubricated through the oil channel in the link.

Transport.

In preparing the guns for transport, the sights only will be removed, the guns with their components being packed in boxes, the sights being also packed in the same boxes separately.

CARRIAGES, LIMBERS, AND WAGONS.

Carriages, Field, B.L., 12-pr., 6 cwt., Marks I*, II.
 Limbers, Field, B.L., 12-pr., 6 cwt., Marks I, II.
 Wagons, Ammunition, B.L., 12-pr., 6 cwt., Marks I, II.
 Wagons, Forge, R.A., Marks I*, II, II*.
 Limbers, Wagon, Forge, R.A., Marks I**, II*.
 Wagons, Store, R.A., Marks I, II.
 Limbers, Wagons, Store, R.A., Marks I*, II*.
 Wagons, Ammunition and Store, R.A., Marks II*, III and IV.

Carriage, Field, B.L., 12-pr., 6 cwt., Mark I*.

(Plate VII.)

The carriage consists, generally, of two side brackets and elevating gear, mounted on an axletree having 2nd class arms, and field wheels.

The side brackets are connected by transoms and the plate portions of the trail eye, and are made of steel plate, riveted to angle steel frames, which are formed at the upper ends into bearings for the gun trunnions. Two compartments are formed between the brackets, each being fitted with a wood block, the upper one to contain a McMahon spanner, a pair of pincers, a claw hammer and a breech screw brush, and the lower a No. 9 oil can.

The trail eye (No. 20) is of steel, the eye being fitted with a steel piece forged in.

The elevating gear (which is actuated by a hand wheel on the left† side of the carriage) consists of an inner and outer screw, right and left handed, bevel pinions and hand wheel; the whole being supported by an oscillating bracket, which is supported in bearings fixed to the side brackets of the carriage.

The recoil spade consists of a spade-shaped toothed blade, suspended under the axle by a telescopic spring case, which is hinged to a bracket fitted to the underside of the carriage below the axletree. The blade is also attached by a wire rope to another spring case fitted obliquely between the side brackets near the trail eye.

When not in use, the spade is raised under the trail and secured by a clip, the handle of which is at the right side of the trail, and can be locked by a keep pin.

When in action the blade is released and touches the ground slightly in rear of the axle. When the gun is fired and the carriage recoils, the teeth of the spade catch in the ground, the carriage moving over the spade, the wire rope attachment drawing out the spring in the trail, and the shaft of the spade compressing the upright spring; after recoil the springs return the gun to the firing position.

† Two batteries with Mark I* carriages have the handwheel on the right side, and the handles for actuating the brake gear on the left side.

The tire brake, which can be used as a recoil brake, or when travelling, or for controlling the return of the gun into the firing position after recoil (if required), consists of a tubular cross shaft, passing through openings in the side brackets, and suspended by tension links from the top of the trail. The shaft is fitted at each end with arms for the reception of cast iron brake blocks, which act on the wheels; it is applied either from the front or rear of the carriage by means of handles which are fixed one on each end of a spindle, supported, in brackets, on the right side† of the carriage. The brake blocks can be reversed when required for travelling on heavy clay ground, in order to give a greater clearance between the brake and the wheels. When used for checking the recoil of the gun the brake blocks are brought into contact with the wheels, and the brake arms released by means of a handle which sets free the retaining catch on the side of the carriage.

Axletree boxes, provided with guard irons, removable standards, leather guards, and back straps, are fitted on each side of the carriage, and are supported over the axletree by brackets. Each box is arranged to hold two rounds of ammunition, case shot on right side and shrapnel on the left. The lids of the boxes (which also serve as seats) are made of tempered steel, and, when fully raised, act as protecting shields for the numbers serving the gun.

The axletree, which is 2nd class, "C" (No. 89), is a tubular steel forging; it is passed through a hole in the front of each bracket, and secured in position by flanges, which pass over octagons cut on the axletree. The axletree is also connected to the side brackets by a stay of steel plate fitted to the underside of the carriage below the axletree.

The wheels are 2nd class, "C," No. 35A, 5 feet in diameter, with steel nave, removable pipe box, and a 3-inch steel tire with rounded edges. The nave consists of two flanges of corrugated steel, which are connected by 14 bolts; the inner flange is fitted with a steel ring to strengthen it, and the outer flange with a metal centering ring; the pipe box is passed through the flanges, and is secured by a nut, which is prevented from working loose by a spring fixed to the centering ring. A spanner, No. 93, is provided for removing the pipe box; it is carried on the "near" side of the ammunition box of the wagon.

A traversing handspike (No. 2, Mark II) fits into a socket which is hinged to the lower part of the trail. In action, the socket is held in position by a pawl; when travelling, it is turned over, and the handspike is strapped to the top of the trail; this handspike is also used as a rammer.

The carriage is furnished with advance rings, hooks for sponge buckets, locking plates, and fittings for carrying two aiming posts. (See packing diagram A.)

Carriage, Field, B.L., 12-pr., 6 cwt., Mark II.

(Plate VIII.)

The carriage consists generally of two side brackets, elevating gear, spade attachment, tire brake, and two axletree boxes mounted on an axletree having 2nd class arms and field wheels.

The side brackets are connected by transoms, top and bottom

† Two batteries with Mark I* carriages have the handwheel on the right side and the handles for actuating the brake gear on the left side.

plates, and the plate portion of the trail eye, and are made of steel plate, riveted to steel angle frames, which are formed at the upper ends into bearings for the gun trunnions, the gun being secured by means of capsquares and keys fitted to the bearings.

The trail eye (No. 28) is of steel.

The elevating gear (which is actuated by a handwheel on the left side of the carriage) consists of an inner and outer screw, right and left-handed, bevel pinions, and handwheel, the whole being supported by an oscillating bracket, which is supported in bearings fixed to the side brackets of the carriage.

The recoil attachment consists of a spade-shaped toothed blade, suspended under the axle by a telescopic spring case, which is hinged to a bracket fitted to the underside of the carriage below the axletree. The blade is also attached by a wire rope to another spring case fixed obliquely between the side brackets near the trail eye.

When not in use the spade is raised under the trail and secured by a pawl, the releasing lever of which is at the right side of the trail, and can be locked by a keep pin.

When in action the spade is released, and touches the ground slightly in rear of the axle. When the gun is fired and the carriage recoils, the teeth of the spade catch in the ground, the carriage moving over the spade, the wire rope attachment drawing out the spring in the trail, and the shaft of the spade compressing the upright spring; after recoil the springs return the gun to the firing position.

The tire brake can be used as a recoil brake, or for controlling the return of the gun into the firing position after recoil (if required), also when travelling. It consists of two brake arms, each pivoted to the side brackets of the carriage, and supported by stays from the top of the trail—two brake rods and a rocking lever. Each brake arm is fitted at its outer end with a cast iron brake block, which acts on the wheel. The arms are actuated either from the front of the carriage by means of a handle attached to the right brake rod, or from the right rear of the carriage by means of a crank formed on the same rod.

Axletree boxes are fitted on each side of the carriage, and are supported over the axletree by brackets. Each box is arranged to hold two rounds of ammunition, case shot on right side, shrapnel on left.

The axletree (2nd class "C," No. 89), is a tubular steel forging; it is passed through a hole in the front of each bracket, and secured in position by flanges, which pass over octagons cut on the axletree.

The wheels are 2nd class "C," No. 35A. (See p. 15.)

A traversing handspike (No. 2, Mark III) is hinged to the lower part of the trail. In action the handspike is held in position by a pawl; when travelling it is turned over and secured to the right side of the trail by a spring clip.

A wooden rammer is carried on the top of the trail on the left side, and secured in position by a spring clip.

The carriage is furnished with locking plates, bands, with bucket hooks and advance rings, and is fitted for carrying a "can, lubricating, No. 9" in leather case, two aiming posts, and various small stores, as shown in packing diagram B.

† Limber, Field, B.L., 12-pr., 6 cwt., Mark I.

(Plate IX.)

The limber consists of a frame and an ammunition box, mounted on a 2nd Class axletree and field wheels, a pole and supporting bar, and two steel swingletrees.

The frame consists of four futchels; the two inner are of steel plate flanged top and bottom, with holes bored in the deepest part to suit the axletree; the two outer futchels are of angle steel, and are bolted to brackets which connect them to the axletree. Diagonal stays, of angle steel, are attached to the outer futchels, over the axletree, and to the inner futchels at their forward ends, where the staple for the pole is riveted between them. A platform and a footboard are bolted to the top, and draught hooks (for the swingletrees), to the front of the outer futchels. At the rear, brackets are fitted on each side of the limber hook for a wood shelf, to facilitate the setting of fuzes.

The ammunition box is of wood; it is fitted with two lids, a striking plate (to take the blow of the trail when limbering up), and cranked guard irons with leather guards. The box is fitted internally with partitions, and arranged to carry a supply of Shrapnel shell, case shot, cartridges, fuzes, and friction tubes.† The projectiles are carried upright, the bottoms fitting in aluminium trays,§ fixed to the bottom of the box; the projectiles are steadied at the top by wooden blocks, which fit between their heads, and are held in notches in the top of the partitions, and the ends of the box, by wood battens attached to the lids. Two cartouches (each holding 22 cartridges) and four fuze boxes (two No. 20, one No. 21, and one No. 28), are carried in suitable compartments. A leather holdall for gun fittings, &c., is attached to the inside of each lid.

Fittings are attached to the rear of the box for securing two portable magazines.

A wrought-iron limber hook (No. 13), with movable steel, is riveted to the inner futchels.

The axletree (No. 98) is of weldless steel tube with 2nd Class arms; it is fixed to flanges, which are attached to the futchels.

The fittings for draught consist of a pole (12ft. 7in. long), two No. 10 Δ swingletrees, a No. 2 supporting bar (3ft. 2½in. long), with a steel socket with two links at each end.

The wheels, No. 35A, are the same as those for the carriage.

The limber is fitted on the underside to carry a 3-lb. grease box and a No. 3 lubricating can, and on the "near" side of the platform board, a steel box for telescopic sight, also various stores as shown in packing diagram A.

† Limber, Field, B.L., 12-pr., Mark II.

(Plate X.)

The limber consists of a steel frame, a limber hook, a 2nd class axletree, a pole with pole bar, two swingletrees, an ammunition box, and two field wheels.

† The limbers for carriage and ammunition wagons are alike.

‡ When the compartment for tubes is not full it will be packed up with sponge cloths, to prevent jolting.

§ These aluminium trays are being replaced by wood blocks.

The frame consists of four futchels, connected by front and rear plates; platform and footboards are fitted to the top, and draught hooks for the swingletrees to the front of the outer futchels.

A wrought iron limber hook (No. 19), is riveted to the inner futchels and the rear connecting plate.

The axletree, No. 98, is of weldless steel tube; it is fixed in flanges, which are attached to the futchels.

The fittings for draught consist of a No. 17 pole (12 feet 7 inches long); two No. 10A swingletrees (2 feet 4 inches long) fitted at each end and in the centre with a steel loop (the end loops are fitted with two links for "rapid" release); and a No. 2 supporting bar (3 feet 2½ inches long), having a steel socket with two links at each end.

The ammunition box is of wood; it is fitted with guard irons, and opens at the rear. The lid opens downwards, and serves as a shelf for fuzing shell; it is prevented from falling below the horizontal position by means of stop plates and stops attached to it and to the sides of the box. The box is divided into two compartments; the lower compartment is arranged to carry a supply of shrapnel shell, case shot, and cartridges in carriers, each carrier containing four cartridges in a tin box, and four shrapnel shells or two case shot respectively; also a tray for carrying an axial vent, obturator, and certain small stores; the upper compartment to carry three fuze boxes, (No. 31), two boxes for T-tubes and a tray for small stores.

The limber is fitted on the underside to carry a 3 lb. grease tin and a No. 3 lubricating can, and on the "near" side of the platform board a steel box for telescopic sight.

The wheels are 2nd class "C," No. 35A, same as for the carriage.

The limber is fitted to carry various stores, as shown in packing diagram B.

Half the limbers per battery will be fitted with loops for kicking straps.

Wagon, Ammunition, B.L., 12-pr., 6 cwt., Mark I.

(Plate XI.)

The wagon consists of a steel frame, a hollow box perch, and an ammunition box, mounted on a 2nd Class axletree, and field wheels.

The frame consists of two flanged sides connected by a rear plate and diagonal stays. A platform and a footboard are fitted to the sides in the front, and at the rear, brackets are fitted for a wood shelf to facilitate the setting of fuzes.

The perch, which is connected to the frame, is made of steel plate; it is fitted with a perch eye (No. 7), with movable steel, locking plates.

The ammunition box is generally similar to that described for the limber, but differs in the arrangement of the internal fittings. Two cartouches, each holding 24 cartridges, a small holdall containing gun fittings, and three fuze boxes (No. 20), are carried in suitable compartments.

The axletree (No. 99) is of weldless steel tube with 2nd Class arms. The wheels are No. 35A, the same as for the carriage and limber.

The wagons are fitted to carry various stores as shown in packing diagram A.

Wagon, Ammunition, B.L., 12-pr., 6 cwt., Mark II.

(Plate XII.)

The wagon consists of a steel frame, a hollow box perch fitted with trail eye and ammunition box, a 2nd class axletree, and two field wheels.

The frame consists of two flanged sides connected by a rear plate and "channel" stays; platform and footboards are fitted to the sides and perch in the front. Two wooden boxes, each carrying a 14 lb. grease tin, are fixed by bands to the underside at the rear.

The perch, which is connected to the frame, is made of steel plate; it is fitted with a perch eye (No. 9), and with locking plates.

The ammunition box is generally similar to that described for the limber, but is larger and differs in the arrangement of the internal fittings; it also has a front compartment, with a lid opening at the top, and is fitted to carry 4 ammunition carriers, marline, and hambro line.

The axletree is No. 99. The wheels (No. 35A) are the same as for the limbers.

A tire brake is provided, which acts on the front of the wheels, and is applied by means of a handle at the rear of the wagon.

The wagon is fitted to carry a No. 93 spanner and various stores, as shown in packing diagram B.

A jointed pole (spare) and a handspike can be carried under the wagon, as shown on Plate XIII.

Dimensions, &c.

	Carriage and Limber.		Ammunition Wagon and Limber.	
	Mark I*.	Mark II.	Mark I.	Mark II.
	ft. ins.	ft. ins.	ft. ins.	ft. ins.
Height to axis of gun.. ..	3 4	3 4	—	—
Length { wagon and limber	—	—	21 8	22 0
of { carriage and { with gun	24 9	24 8	—	—
{ limber { without gun	23 1	22 7	—	—
axletree	6 2	6 2	6 2	6 2
Length between axletrees	9 0	8 1	7 3	7 4½
Greatest projection beyond track of wheels..	0 6	0 6	0 6	0 6
Maximum width	6 2	6 2	6 2	6 2
Wheels { track	5 2	5 2	5 2	5 2
{ height	5 0	5 0	5 0	5 0
Space required to turn in	33 0	29 8	30 0	30 0
Angle { of trail (carriage trail on ground)..	28½°	27° 45'	—	—
{ of lock	62°	55°	60°	60°
Upsetting angle	32°	38° 30'	33°	37° 30'

Average Weights.

(Fully packed with ammunition and stores, but without men or personal equipment).

	Carriage and Limber.		Ammunition Wagon and Limber.	
	Mark I*.	Mark II.	Mark I.	Mark II.
	cwt. qr. lb.	cwt. qr. lb.	cwt. qr. lb.	cwt. qr. lb.
Carriage, with gun	7 3 20	16 2 13	—	—
Limber { carriage	15 0 0	14 2 7	15 1 0	14 2 9
wagon	—	—	18 9 0	19 1 10
Wagon, ammunition	—	—	—	—
Carriage and gun, with limber	32 3 20	31 0 20	—	—
Wagon ammunition and limber	—	—	33 1 0	33 3 19
Carriage. Pressure of trail on ground	1 1 0	1 1 0	—	—
Wagon, ammunition. Pressure of perch on ground ..	—	—	1 2 0	—
Weight at end of pole limbered up	0 1 2	0 1 2	0 1 2	0 1 2
Wheel { No. 35A	1 3 10			
" 36	2 0 10½			
" 42	2 0 16			

Wagon, Forge, R.A., Mark I*.

Limbers, Wagon, Forge, R.A., Mark I**.

(Plate XXI.)

These wagons and limbers are the Mark I pattern, converted to conform as far as possible to the Mark II pattern. Runners and guides are fitted to the tailboard and bottom of the wagon, to carry the Mark II G.S. field forge. The wagon is fitted with four under boxes and two lantern boxes (one for two distinguishing lanterns,† and one for two folding lanterns) on top, and four bale hoops for a canvas cover. The perch is fitted with a recessed plate to receive the plate of the clamping screw of the vice when in use.

The limber for this wagon is the Mark I pattern, fitted for pole draught, and with the limber box altered internally to conform to the limber box of the Mark II* and Mark III* limbers.

The pole draught will be the same as that for the carriage and wagon limber.

The wheels are 2nd class "C," No. 36.

A tire brake is provided, which acts on the rear of the wheels and is applied by means of a handle at the rear of a wagon.

The wagon and limber can be packed to carry either the stores of the Mark I*, or II equipments. (See packing diagram C).

† Distinguishing lanterns are carried with ammunition columns only.

Dimensions, &c.

Total length with pole	ft. in.
Maximum width	23 1
Length between axles	6 4
Length between axles	7 7½
Wheels { track	5 2
{ diameter	5 0
Space required to turn in	32 0
Angle of lock	58°
Upsetting angle, packed	35°
Rectangular space occupied in boats	14 ft. 2 in. × 6 ft. 4 in.
Tonnage { for shipment	6.83 tons.
{ „ transport in boats	17 „

Weights (Approximate).

(Packed, including equipment.)

	wt.	qr.	lb.
Wagon and limber	11	3	0
Wagon and limber { weight on two fore wheels	17	2	0
{ „ „ hind „	27	1	0
Wagon (perch on ground)	28	2	18
Limber	16	0	10
Weight at end of pole	0	1	6
Pressure of perch on ground	3	2	0

Wagon Forge, R.A., Mark II and II*.

Limber, Wagon, Forge, R.A., Mark II*.

(Plate XXI.)

The wagon consists of a frame of angle iron, a perch, and an axle-tree built up on the box girder principle, and two field wheels.

The perch is formed of two pieces of "channel" iron connected by collar bolts, top and bottom plates, and a perch eye (No. 4.), which is riveted between them at the front; it is fitted to carry an anvil and block on the top, and a drag shoe and chain on the "off" side. On the top of the perch two holes are drilled to receive a vice, and a recessed plate is attached to receive the plate of the clamping screw of the vice when in use.

The frame of the wagon is boarded over, and fitted with side boards and movable head and tailboards, to form the body of the wagon.

The body is divided into two compartments by a cross partition. The hind compartment is covered with a lid which is hinged to the partition. The front compartment is covered by two removable cutting boards and a narrow flap, which is hinged to the cover of the hind compartment. Two tool chests (one for smiths' tools and one for wheelers' tools) are carried in the front compartment. Angle plates are fitted to the bottom and to the tailboard, so that the wagon may take either a "Forge, field, R.A., Mark IV," or "Forge, field, G.S., Mark II;" when the latter is carried the wagon will be described as Mark II*.

The wagon is fitted with four under boxes, two lantern boxes (one for two distinguishing† lanterns, and one for two folding lanterns), and four bale hoops for a canvas cover.

The limber for this wagon is the Mark II pattern, fitted for pole draught, and with a limber box arranged internally for cans, boxes, and tins to carry the oil, dubbing, &c., allowed for this equipment.

The pole draught is the same as that for the carriage and ammunition wagon and limber.

† Distinguishing lanterns are carried in the ammunition column on "Y."

Weights (Approximate).

(Packed, including personal equipment).

				ewt.	qr.	lb.
Wagon and limber..	..	..	..	39	1	2
Wagon and limber {	weight on two fore wheels..			15	2	3
	" " hind " ..			23	3	9
Wagon (perch on ground)	..	..	..	24	2	19
Limber ..	..	..	..	14	2	21
Weight at end of pole ..	..	..	..	0	1	0
Pressure of perch on ground	..	..	..	2	2	3

Wagon, Store, R.A., Mark II.

Limber, Wagon, Store, R.A., Mark II*.

(Plate XXIII.)

This wagon consists of a frame of angle steel, a steel perch, a tubular axletree, and two field wheelers; the body is fitted with four wooden boxes, secured by nib irons and thumb screws; the three front boxes are for carrying stores, and the rear box for stationery.

The perch is formed of steel plate, bent so as to form a tapering box girder, and fitted with a perch eye (No. 7). Two propsticks are fitted on the under side.

The axletree is tubular steel, 2nd Class "C," No. 38.

The wagon is fitted with four bale hoops and a canvas cover.

The stores carried on the top of the wagon are the same as those for the Mark I.

The limber is generally similar to the carriage limber, but is fitted with a special box for stores.

The wheels are 2nd class "C," No. 36.

A tire brake is provided which acts on the rear of the wheels, and is applied by means of a handle at the rear of the wagon.

This wagon and limber can be packed to carry the stores of either the Mark I*, or II equipments. (See packing diagram E.)

Dimensions, &c.

	ft.	in.
Total length with pole	22	9
Maximum width	6	2
Length between axles	7	9½
Wheels { track	5	2
{ diameter	5	0
Space required to turn in	29	4
Angle of lock	60°	
Upsetting angle, packed	29¼°	
Rectangular space occupied in boats	14 ft. 2 in. × 6 ft. 2 in. × 7 ft. 3 in.	
Tonnage { for shipment	8-127 tons.	
{ transport in boats	16-089	

Weights (Approximate).

Packed (including personal equipment).

			cwt.	qr.	lb.
Wagon and limber			35	2	0
Wagon and limber { weight on two fore wheels			15	2	0
" " " " " hind "			20	0	0
Wagon (perch on ground)			21	1	0
Limber			14	1	0
Weight at end of pole			0	1	11
Pressure of perch on ground			1	3	17

Wagon, Ammunition and Store, R.A., Mark II*

(Plate XIV.)

The body of this wagon consists of a framework formed by two sides, *a*, and two summers mortised into a front and rear earbed, *b*. This framework is strengthened by plates riveted on the inside; it is housed and bolted to a front bolster, *c*, a cross bar, *d*, and a rear bolster, *e*. In front and rear of the front bolster, front and rear wheel bolsters, *f*, are bolted to the summers, and to these three the upper wheel plate, *g*, is attached. The front bolster is shod with a friction plate, and is plated at the sides.

The body is supported over the hind axle upon two side stays of T-iron, and a cross stay of round iron. Each side stay rests in an axle block of oak upon the shoulder of the axletree, where it is secured by axletree staples, by a clip plate, and by the end of the cross stay, which latter serves as a coupling plate.

The frame is boarded over to form the bottom of the wagon, and movable sides, *A*, head-board, *B*, and tail-board, *C*, are fitted to it.

A locker is formed in front of the wagon body by a sliding partition. The lid of the locker is fitted with a raised box and driving seat, *k*, a back board, *l*, being hinged to it, and a footboard, *m*, to the head-board of the wagon. A small locker, *n*, is also formed between the summers underneath the rear of the wagon.

These wagons are now fitted with cranked guard-irons, and the driver's seat is made slightly higher for convenience in driving with long reins. The footboard is increased in length and width, and fitted with a long toe-piece, and further supported by iron stays fitted to its under side and to the front earbed.

The fore carriage of the wagon is formed of four futchels, *o*, housed in and bolted to a splinter bar, *p*, and a cross bar, *q*. An upper bolster, *r*, is bolted over, and an under bolster, *s*, beneath the centre of the futchels. A wheel plate is attached to the upper bolster, to the cross bar, and to a small wheel bolster, *t*, placed in front. The upper bolster is shod with a friction plate, and both it and the lower bolster are strengthened by plates.

The frame of the fore carriage is supported over its axle in the same manner as the body over the hind axle.

The wagon is fitted for pole draught, which consists of a pole, bar supporting pole, and two swingletrees.

The body and fore carriage are connected by a main pin, which is passed through bolster plates in the main bolsters, and is keyed beneath.

The footboard is of elm, the other boarding of yellow deal, and the remainder of the woodwork of the wagon of oak.

The fore wheels† are 2nd class B, No. 28, 3 feet 4 inches in diameter, the hind† 2nd class C, No. 35A, 5 feet in diameter. The axles are 2nd class.

The wagon is fitted to carry a spare fore wheel, and entrenching tools. Staples are fitted on the head board to carry the picketing gear in a bag, secured by straps. A locking plate, *u*, is attached beneath the frame to prevent the fore wheel injuring the latter in wheeling on rough ground.

* Earlier issues of these wagons may be found with Nos. 33 (fore) and 32 (r 39 (hind) wheels; these will be replaced as they become unserviceable by Nos. 28 and 35A.

Clip plates are attached to the floor (at the rear) of the wagon to take the bracket portion of a spare wheel arm, which will be supplied with such wagons as are allotted for carrying spare gun-wheels.

The wagon is fitted with a tire brake which acts on the rear of the wheels and is applied by means of a handle at the rear of the wagon. A scotch roller is also provided.

The following articles belong to the wagon, namely, five bale hoops, *x*, a waterproof canvas cover with two lashing ropes, bar stay, three lashing ropes to secure the spare wheel, and two half-round grease tins.

The bale hooks are of ash, fitted with leather stops, and numbered from one upwards, commencing with the front hoop, a corresponding number being placed upon the wagon side at the upper staple for the bale hoop. The front hoop has also the register number of the wagon painted upon it.

The canvas cover is waterproofed, or painted khaki colour, and has the register number of the wagon painted upon it.

The bar stay is of ash, to fit from side to side, and keep the sides from spreading out when the wagon is packed and the tailboard down.

The extreme load is 2 tons.

Weight	20½ cwt.
Tonnage { for shipment	4.659 tons
{ for transport in boats	12.837 "
Rectangular space occupied in boats	11 ft. 4 in. x 6 ft. 3 in.
Upsetting angle	30°
Angle of lock	103°
Space required to turn in	23 ft. 7 in.

A certain number of Mark III wagons have been made, but they differ from the Mark II* wagon in a few manufacturing details only.

Wagon, Ammunition and Store, R.A., Mark IV.

(Plate XIV.)

The body of the wagon consists of a framework, formed by two sides, and a central summer, housed to a front bolster, centre crossbar, wheel-plate bolsters, rear crossbar, and rear carbed. In front and rear of the front body bolster, front and rear wheel bolsters are bolted to the sides and summer, and to these three the wheel plate is attached.

The framework is boarded over to form the floor of the wagon, and fixed sides, partition for locker, and a tailboard, are fitted to it. The side frames and summers are extended to the front, and arranged to support a footboard.

A locker is formed in the front part of the wagon; it is built up above the sides of the wagon, and fitted with a back rail so as to form a driving seat. Access to the locker is obtained from the front by means of a hinged flap, which is secured by a hasp and turnbuckle.

The body is supported over the hind axletree upon two springs, which are attached by lugs to the centre crossbar and sides, to the carbed and sides by scroll irons, and to the axletree by clips, staples, and coupling plates.

A spare gunwheel can be carried at the rear of the wagon on a wheel arm, and a spare forewheel can be carried lashed under the

wagon. Clip plates are attached to the floor of the wagon (at the rear) for the bracket portion of the spare wheel arm to fit into. The wheel arm will, however, only be issued for such wagons as are allotted to carry spare gun wheels.

The fore carriage consists of two futchels, main bolster, front and rear wheel-plate bolsters, crossbars, and splinter bar. The bolsters and crossbars are housed on to the futchels, the former on top and the latter underneath. The upper part of the bolsters are shed with friction plates to work against the wheel plate on the body. The fore carriage is supported over its axle upon two springs, which are attached to the crossbar by lugs, and to the axletree by clips, staples, and coupling plates. The splinter bar is fixed to the front of the futchels, and stayed to the front crossbar by round iron stays, the front ends of which are formed into draught hooks.

The wagon is fitted for pole draught, similar to the Mark II* wagon.

The body and fore carriage are connected by a main pin, which is passed through the summer and main bolsters, and is keyed beneath.

The fore wheels are 2nd Class "B," No. 28, 3 feet 4 inches in diameter, and the hind wheels, 2nd Class "C," No. 33A, 5 feet in diameter.

The fore axletree is 2nd Class B, and the hind axletree, 2nd Class C.

A tire brake is fitted to the wagon, which acts on the rear of the wheels, and is applied by means of a handle at the rear of the wagon. A scotch roller is also provided.

Staples are fitted for bale hoops, and lashing hooks for canvas cover.

Weight	19 cwt. 8 lbs.
Extreme load	40 " 0 "
Tonnage { for shipment	8 1/4 tons.
{ for transport in boats	14.665 tons.
Rectangular space occupied in boats	12 ft. 7 in x 6 ft. 3 in.
Upsetting angle	33°
Space required to turn in	25 ft.

Certain wagons of this description when used for carrying baggage or tents will be supplied with raves on each side, and a "cover, wagon, G.S., Mark IV."

Note.—The stores carried in this wagon are laid down in the Tables of Equipment.

CARE AND PRESERVATION.

See also "Regulations for Magazines, and the Preservation of War Matériel."

All rubbing parts of the carriage spring cases should be greased before being put together. The disc under the leather cap of the rear spring, and the telescopic cases of the spring under the axle should be occasionally oiled, and grit and dirt wiped off.

In all cases where nuts are not prevented from shaking loose by split keys, the end of the bolt should be slightly riveted over the nut after screwing up.

When it is required to remove the axletree, the left flange, which is bolted on, must be taken off.

To replace springs in rear spring case, remove the shackle and

pin connecting the wire rope to the rod, remove the leather cap and withdraw springs and rod, place new springs on the rod and screw up to the required length before inserting in the spring case; replace the shackle connecting wire rope, also the leather cap.

To replace springs in front spring case, remove the split key and set screw securing the case to hinge, and unscrew the outer case, insert new spring, screw up the outer case and replace the set screw and split key.

When brake blocks require to be replaced, they must be driven out of the shoes from the underside.

When the split pin for locking the spade releasing lever is removed, to enable the spade to fall, it must not be replaced until after the spade is put up in the travelling position, or the pawl may be injured.

Special attention should be given to the springs for releasing levers, and at any appearance of weakness or injury they should at once be renewed.

Care must be taken in securing the spare pole under the ammunition wagon, it must be disconnected at the joint, and lashed in the position shown on *Plate XIII*, so that it will be clear of the brake handle when applying the brake.

AMMUNITION.

CARTRIDGES.

Cartridge, B.L. 12 $\frac{7}{16}$ oz. cordite, size 5.

Cartridge, B.L. 1 $\frac{1}{4}$ lb. blank.

(*Plate XV.*)

The Mark I cordite cartridge is made of red shalloon, 7 $\frac{3}{4}$ to 8 $\frac{1}{4}$ inches long, sewn with one row of silk, the bottom circular, and sewn with two rows of silk. The charge consists of 12 $\frac{7}{16}$ oz. cordite, size 5 made up in a bundle, and tied in three places with two turns of silk twist. A primer of 4 drams R.F.G.2, or new blank F.G. powder is placed at each end of the cartridge. The dimensions are:—

Length (not to exceed)	..	..	6.2 inches.
Diameter „ „	..	..	2.2 „

The Mark II cartridge differs from Mark I only in the primer which consists of one dram of guncotton yarn, stemmed in, at each end.

The saluting charge is 1 $\frac{1}{4}$ lb. blank in a cartridge of No. 1 silk cloth, choked with silk twist, and hooped with three silk braids.

Length (not to exceed)	..	..	5.5 inches.
Diameter „ „	..	..	3.0 „

NOTE.—The tampon is not to be placed in the gun except in the gun park.

PROJECTILES.

Nature.	Diameter.		Length.	Bursting charge.		Weight filled and fuze.
	Body.	Band.		Nature.	Weight.	
	in.	in.	in.		oz.	lb. oz.
Shell, Shrapnel, Marks II to V	2.98	3.09	8.349	R.F.G.2	1½	12 8
Shot, case, Mark V	2.97	3.09	9.0†	..	..	13 4

Shrapnel Shell.

(Plates XVI, XVII.)

Mark II.—The body of the shell is of forged steel. At a distance of 0.15 inch from the base, a groove is turned; three ridges project on the groove, and six axial chisel marks are cut across the ridges to prevent the driving band turning on the shell.

The head of the shell is made of charcoal iron, or Bessemer steel, struck with a radius of one and a half diameters; is truncated and screwed to receive a gunmetal socket; the interior of the socket is bored and screwed to the G.S. taper.

In the base of the shell is fitted a sheet iron (tinned) cup to contain the bursting charge. A steel disc rests on the shoulder in the bottom of the shell to support the metal balls; into the disc screws the lower end of the central tube; its upper end being secured after passing through the socket, by a gunmetal nut. The top of the tube is screwed internally to receive a primer.

The shell is lined with brown paper. A steel wire cage, with steel disc attached, is inserted in the shell to contain the metal balls. The cage consists of 12 vertical wires soldered in the slots round the circumference of the steel disc; a piece of flattened iron wire is wound round the outside of the vertical wires in the form of a spiral.

The cage is fitted with 156 mixed metal balls, 35 to lb., the interstices being filled with resin (any deficiency in the weight of the shell is made up with buck shot).

The head of the shell is fitted with a block of wood and felt washer; and is attached to the body by screws and pins. A steel disc is placed in the head, over the balls.

The general form of the shell is shown on the Plate.

Mark III differs from Mark II in having the metal balls contained in a perforated tin cylinder, and a stronger steel disc over the chamber which contains the bursting charge. This shell, with undercut grooves for driving band, is designated Mark IV, and with the new pattern driving band (*see Plate XVII*) it is known as Mark V. Some *Mark I* shells have had their contents altered to render them practically identical with Mark III, such shells will be known as Mark I*.

The shell should only be carried fuze—

- (a) On active service, when in the judgment of the battery commander, it is desirable to be prepared for immediate action.
- (b) At practice camps, when necessary for the rehearsal of (a).

† Over handles—Length over body, 8.5 inches.

It must be remembered that the fuzes when once taken out of their cylinders gradually deteriorate; shell should therefore not be fuzeed earlier than is necessary.

When the fuze is placed in the shell in accordance with (a) and (b) above, the becketts of the safety pins should be looped over the nut of the fuze. This is to prevent the possibility of the becketts being rubbed between the lid and the ammunition box, and thus becoming liable to break when the safety pins are pulled.

Note.—On an emergency, a 15-pr. B.L. shell (*not charge*) may be fired from a 12-pr. B.L. 6 cwt. gun (75/12/5877). The M.V. with a 15-pr. shell is 1,478 f.s., and the pressure per square inch 16.075 tons.

Case Shot.

(Plate XVIII.)

Mark V is made of X.X.S. tin, in one piece, lap jointed and soldered. The base is made of iron and is fitted with a copper driving band, and a straight handle; the upper portion of the base is recessed to receive the driving band. The body has an inside lining of two steel segments, and contains 290 mixed metal balls (34 per lb.), the interstices being filled with a mixture of equal quantities of clay and sand. A disc of iron, or mild steel, rests on top of the base inside the lining. The top is closed by a disc of iron or mild steel.

The base is secured to the body by the bottom of the latter being pressed into the recess for, and being held by the driving band; the bottom of the recess is milled.

PREPARATION, &c., OF PROJECTILES.

See "*Regulations for Magazines and the Preservation of War Matériel.*"

FUZE, TIME AND PERCUSSION, No. 56, MARK IV.

(Plate XIX.)

The fuze consists of the following parts (made of gunmetal, except when otherwise stated), viz.:—Body, detonator plug with detonator, percussion pellet, brass spiral spring, base plug, brass safety pellet, brass ball, composition ring, dome, brass washer, cap, two safety pins and two leather washers.

The *body* is screwed at the lower end to G.S. fuze hole gauge, and is bored from the bottom to receive a percussion pellet and base plug. Two holes are bored beyond the recess for percussion pellet, one for the detonator plug, the other for the safety pellet.

The *detonator plug* is screwed on the outside and filled with a detonator.

The hole bored for the detonator plug is continued above it to form a small magazine filled with F.G. powder. In the top of the body is bored a recess to contain a perforated pellet of pressed pistol powder, which communicates with the magazine by a hole bored at right angles to the axis of the fuze. The stem on the body is screwed

on top to take the cap, two grooves being cut in the top end of stem to receive the feathers on the brass washer. A groove is cut in the top face of body, close to the stem, and half way round it, and a gas escape hole bored obliquely through the body into the groove. A small tablet of fine white paper is secured with shellac to the body of the fuze over the perforated powder pellet, and over it two washers of fine white paper and calfskin are secured with shellac, a hole being cut through the washers and tablet immediately over the powder pellet.

The *percussion pellet* has a cut in the side for the safety pellet and ball to fall into when set in action. A hole is made transversely through the pellet and fitted with a brass retaining bolt, held in position by a brass spiral spring. The pellet contains a powder charge of F.G. powder. A small set screw in the wall of the body fits into a slot in the percussion pellet to prevent it from turning in flight.

The *base plug* has a conical hole bored in it, and is closed at the bottom by a shalloon disc and brass washer spun in; it contains a perforated pellet of pressed powder, secured by a brass washer spun over on top.

The *safety pellet* has a slot cut in the side to clear the brass ball, and is suspended in the body by a thin copper wire passing through it. A hole is also bored in the upper part of the pellet and body of fuze for the safety pin to pass through.

× The *composition ring* has a chamber on one side and three projections on the inside to keep it concentric with the stem of the body. The chamber has a hammer with a steel needle suspended in it by a copper wire over a patch of detonating composition. A safety pin also passes through the hammer and chamber. The ring has a groove on the underside filled with composition and connected with the chamber by a lighting hole. The outside of the ring is graduated from 0 to 18, each division being subdivided into halves and quarters, with a broad arrow at the point where the groove is interrupted by a bridge soldered in.

The *dome* is made of sheet brass.

The *washer* is made of sheet brass with two feathers, which fit into featherways cut in the top of the stem. When screwing up the cap the washer remains stationary, thus preventing the dome from turning and altering the setting of the fuze.

The *cap* is hexagonal in form, and screws on the stem of the body.

The fuze is stamped **T** on the composition ring close to the time safety pin, and **P** on the body close to the percussion pin.

The fuze should be set *before* the safety pins are withdrawn.

To set the time arrangement, the cap is loosened with the "key, fuze, universal," and the ring moved round until the graduation ordered is exactly in line with the arrow, or black triangular mark, on the body; the fuze is then clamped by screwing down the cap as tightly as possible, care being taken that the ring and dome have even bearings.

If the fuze is required to act as a percussion fuze only, the **P** pin should be withdrawn and the **T** pin left in position; otherwise both pins should be withdrawn; but this should not be done till the moment of loading.

Action.—On discharge, if the time safety pin has been withdrawn, the hammer sets back, shearing the suspending wire and igniting the time ring, which burns until it comes over the detonator, and the pellet, and so flashes down through the radial magazine, detonator pellet, and base plug, and into the shell.

If the percussion pin has been withdrawn, the safety pellet sets back, shearing the suspending wire, and the brass ball falls down into the space over the safety pellet. The centrifugal bolt, owing to the rotation of the shell, is withdrawn, the percussion pellet is free to move forward on impact and ignite the detonator, which flashes through the percussion pellet and base plug into the shell.

At rest it burns about 13 seconds.

These fuzes are issued 1 in a tin cylinder.

TUBES.

T Friction Tube, Marks I*-IV

(Plate XX.)

Mark II.—The form and general dimensions of the tube are shown on the plate, and consist of the following principal parts:—Body (*a*), head (*b*), ball (*d*), plug (*e*), friction wire (*f*).

The head is of gunmetal, the body of solid-drawn brass, the ball of soft copper, and the friction bar of half-round copper wire, twisted into a round bar, with a loop at one end and the other roughened. A charged with about 2 grains of detonating composition in the form of hole in the side of the head of the tube over the friction wire is a paste laid over the roughened part of the friction wire. A gut skin disc (*g*) is placed over the composition, and a shellaced cork plug (*h*) inserted over the disc, the hole being filled up flush with shellac cement. The body is charged with 8 grains of pistol powder, and is closed with a shellaced cork plug (*i*) covered with shellac cement, and a paper disc (*k*).

A brass pin (*c*) is inserted to prevent the body becoming unscrewed. The upper part of the body has a central perforation, which is enlarged in its lower part into a conical recess. The ball (*d*) is placed in this recess, and is retained therein by a screwed plug (*e*) pierced by three fire holes.

On the withdrawal of the friction bar, the detonating composition is ignited, and the flash, passing down the perforation in the head and through the plug, fires the powder charge. The ball is driven upwards by the explosion, and seals the tube. This, together with the mode in which the tube is held in the special vent employed with it, prevents the escape of gas.

The body is lacquered inside and outside.

Mark III differs principally from *Mark II* in the method of fixing the friction bar, which is suspended by a "shearing" wire at the base of the loop.

Mark IV differs from *Mark III* in having the loop of the friction wire made larger, and the opening in the head correspondingly altered.

Some Mark I and Mark II tubes have been converted to conform generally to Mark III. Such tubes will be known as Mark I and Mark II* respectively.*

Total length of tubes 1.9 inch.

The tubes are issued in square tin boxes, 10 in a box. Both the top and the bottom of the box are removable, being secured by

soldered bands, and the tubes are so arranged that five may be withdrawn from the top and five from the bottom.

NOTES.

The vent channel sometimes becomes choked with residue from the cartridge. When this occurs, the taper portion should be cleared with a "rimer vent, T," sufficiently to allow of the insertion of a tube which, when fired, will remove the rest of the obstruction.

Tubes, after firing, are to be returned to Woolwich to be repaired and refilled; they should be immersed in mineral oil within 24 hours after firing, for which purpose $\frac{1}{2}$ gallon of oil per 100 tubes—of which 2 ounces ($\frac{1}{10}$ pint) would be used up in the treatment—is allowed.

T Friction Tube Drill, Mark I.

(Plate XX.)

The drill tube is made of hardened steel, of the same external shape as the Service tube. The head is grooved to receive a hardened steel spring, which is attached in the groove by a screw from the under side of the head. The end of the spring is bent down to nearly meet the bottom of the groove, which is raised to form a jaw, through which the hook of the lanyard can be drawn by a pull of about 50 lb.

Total length 1.9 inch.

Range Table for 12-pr. B.L. Gun of 6 cwt. Mark I.

Based on Practice of 1912-13.

Charge, { weight, 12½ oz.
gravimetric density, $\frac{90.05}{0.307}$
nature, cordite, size 5.

Muzzle velocity, 1,523 f.s.

Nature of mounting, travelling, field.

Projectile, { nature, Shrapnel shell.
weight, 12½ lb.

Jump, + 26 minutes.

Remaining velocity.	5 minutes' elevation or deflection alters point of impact.		Deflection for drift (Telescopic sight).	Slope of descent.	Elevation.	Range.	Fuse scale for time and percussion fuze. Mark IV.	50 per cent. of rounds should fall in.			Time of flight.
	Range.	Laterally or vertically.						Length.	Breadth.	Height.	
f.s.	yds.	yds.	° ' "	1 in	° ' "	yds.		yds.	yds.	yds.	secs.
1477	50	0.14	...	343	0 18	100	1	17	0.14	0.05	0.21
1432	50	0.29	...	171	0 8	200	1	17	0.14	0.11	0.48
1390	50	0.43	0 1	118	0 2	300	1	17	0.14	0.16	0.72
1348	50	0.58	0 1	84	0 10	400	1	17	0.14	0.21	0.96
1309	50	0.72	0 1	71	0 19	500	1	17	0.14	0.25	1.20
1270	49	0.87	0 1	59	0 28	600	2	18	0.15	0.32	1.45
1235	49	1.01	0 2	49	0 38	700	2	18	0.16	0.40	1.70
1200	49	1.16	0 2	43	0 49	800	3	19	0.18	0.47	1.95
1168	48	1.31	0 2	37	0 59	900	3	19	0.20	0.56	2.20
1137	48	1.45	0 3	33	1 09	1000	3	20	0.24	0.64	2.45
1108	47	1.60	0 3	29	1 19	1100	4	20	0.28	0.74	2.71
1080	46	1.74	0 3	26	1 29	1200	4	20	0.33	0.85	2.98
1059	45	1.89	0 3	23	1 40	1300	5	21	0.38	0.97	3.24
1038	44	2.03	0 4	21	1 51	1400	5	21	0.44	1.09	3.51
1022	43	2.18	0 4	19	2 03	1500	6	22	0.50	1.22	3.78
1006	41	2.32	0 4	17	2 15	1600	6	22	0.57	1.35	4.05
990	40	2.47	0 5	16	2 28	1700	6	23	0.64	1.51	4.34
975	39	2.61	0 5	14	2 41	1800	7	23	0.72	1.66	4.63
961	37	2.76	0 5	13	2 54	1900	7	24	0.81	1.82	4.92
947	36	2.91	0 6	12	3 08	2000	8	24	0.90	2.00	5.22
933	35	3.05	0 6	11	3 22	2100	8	25	1.00	2.23	5.52
920	34	3.20	0 6	11	3 36	2200	9	26	1.11	2.46	5.83
907	33	3.34	0 7	10	3 51	2300	9	27	1.22	2.70	6.14
894	32	3.49	0 7	9	4 06	2400	10	28	1.34	3.03	6.45
881	31	3.63	0 8	8	4 22	2500	10	29	1.45	3.36	6.78
869	30	3.78	0 8	8	4 39	2600	11	30	1.58	3.70	7.11
857	29	3.92	0 9	7	4 56	2700	11	32	1.69	4.30	7.46
846	29	4.07	0 9	7	5 14	2800	12	35	1.66	4.93	7.81
834	28	4.21	0 10	6	5 32	2900	13	29	1.62	6.75	8.16
823	28	4.36	0 10	6	5 50	3000	13	51	1.57	8.57	8.52
813	27	4.51	0 11	6	6 09	3100	14	60	1.52	10.0	8.89
803	26	4.65	0 11	5	6 28	3200	14	67	1.46	11.9	9.27
793	26	4.80	0 12	5	6 48	3300	15	73	1.40	13.7	9.69
783	25	4.94	0 12	5	7 09	3400	15	78	1.35	15.6	10.06
773	24	5.09	0 13	4	7 30	3500	16	82	1.30	17.2	10.47
763	24	5.23	0 13	4	7 51	3600	17	86	1.26	18.8	10.88
753	23	5.38	0 14	4	8 13	3700	17	88	1.22	20.4	11.32
744	22	5.52	0 14	4	8 36	3800	...	90	1.19	21.7	11.77
735	22	5.67	0 15	3	8 59	3900	...	91	1.16	23.0	12.22
726	21	5.81	0 16	3	9 25	4000	...	92	1.19	24.4	12.68
717	21	5.96	0 16	3	9 50	4100	...	93	1.23	26.2	13.16
708	20	6.11	0 17	3	10 15	4200	...	93	1.29	28.1	13.64
699	20	6.25	0 17	3	10 41	4300	...	94	1.37	29.9	14.13
690	19	6.40	0 18	3	11 8	4400	...	95	1.47	31.7	14.62
681	19	6.54	0 19	2	11 34	4500	...	95	1.57	33.4	15.12
672	19	6.69	0 20	2	12 01	4600	...	96	1.69	35.1	15.62
664	18	6.83	0 20	2	12 28	4700	...	96	1.81	36.9	16.12
656	18	6.98	0 21	2	12 56	4800	...	97	1.93	38.8	16.62
648	18	7.13	0 22	2	13 24	4900	...	97	2.05	40.7	17.14
640	17	7.27	0 23	2	13 52	5000	...	98	2.17	42.6	17.66
632	17	7.42	0 24	2	14 20	5100	...	98	2.29	43.8	18.18
624	17	7.56	0 25	2	14 48	5200	...	99	2.41	45.0	18.70

Range Table for 12-pr. B.L. Guns, Marks II and III.

Based on Practice of 8 and 12.1.1900.

Dated 13.2.1900.

Charge, { weight, 12 $\frac{1}{2}$ oz.
gravimetric density, $\frac{112.6}{0.2161}$.
nature, Cordite, size 5.

Projectile, { nature, forged steel, shrapnel,
Mark I I.
weight 12 $\frac{1}{2}$ lb.

Muzzle velocity, 1454 f.s.

Nature of mounting, field travelling,
Mark I* (experimental).Jump, + 24 $\frac{1}{2}$ minutes.

Remaining velocity.	5 minutes' elevation or deflection alters point of impact.		Deflection for drift (telescope sight).	Slope of descent.	Elevation.	Range.	Fuze scale for time and percussion fuze. No. 56, Mark IV.	50 per cent. of rounds should fall in			Time of flight.
	Range.	Vertically or laterally.						Length.	Breadth.	Height.	
f.s.	yds.	yds.	°	1 in	°	yds.		yds.	yds.	yds.	secs.
1418	50	0.14	...	229	-0.16	100	1	...	...	...	0.23
1382	50	0.29	...	114	-0.6	200	1	...	...	...	0.47
1347	49	0.43	0.1	74	0.4	300	1	...	...	...	0.71
1312	48	0.58	0.1	60	0.14	400	1	...	...	...	0.96
1278	47	0.72	0.1	45	0.24	500	1	...	...	...	1.21
1244	46	0.87	0.1	35	0.34	600	2	24.0	0.54	0.7	1.46
1212	45	1.01	0.2	30	0.44	700	2	24.5	0.55	0.8	1.72
1180	44	1.16	0.2	26	0.55	800	3	25.0	0.56	0.9	1.98
1150	43	1.31	0.2	23	1.6	900	3	25.5	0.57	1.1	2.25
1120	42	1.45	0.3	20	1.17	1000	3	26.0	0.58	1.3	2.52
1092	41	1.60	0.3	18	1.28	1100	4	26.6	0.60	1.5	2.80
1064	40	1.74	0.3	16	1.40	1200	4	27.2	0.62	1.7	3.08
1038	39	1.89	0.3	14	1.52	1300	5	27.8	0.65	2.0	3.37
1013	38	2.03	0.4	13	2.5	1400	5	28.4	0.68	2.2	3.66
989	37	2.18	0.4	12	2.18	1500	6	29.7	0.71	2.5	3.96
967	36	2.32	0.4	11	2.32	1600	6	30.7	0.74	2.8	4.26
946	35	2.47	0.5	10	2.46	1700	7	31.8	0.78	3.1	4.57
926	34	2.61	0.5	10	3.1	1800	7	33.0	0.82	3.4	4.88
908	33	2.76	0.5	9	3.16	1900	8	34.3	0.87	3.8	5.20
891	32	2.91	0.6	8	3.32	2000	8	35.7	0.92	4.4	5.52
875	31	3.05	0.6	8	3.48	2100	9	37.3	0.97	4.9	5.85
860	30	3.20	0.6	7	4.4	2200	9	39.0	1.02	5.3	6.19
846	29	3.34	0.7	7	4.21	2300	10	40.8	1.08	5.7	6.54
832	28	3.49	0.7	7	4.39	2400	10	42.6	1.14	6.2	6.89
819	27	3.63	0.8	7	4.57	2500	11	44.5	1.21	6.7	7.25
806	26	3.78	0.8	6	5.16	2600	11	46.4	1.28	7.3	7.61
794	26	3.92	0.9	6	5.35	2700	12	48.5	1.36	8.0	7.98
782	25	4.07	0.9	6	5.55	2800	13	50.7	1.44	8.9	8.35
771	25	4.21	0.10	5	6.15	2900	13	53.1	1.53	10.0	8.73
760	24	4.36	0.10	5	6.36	3000	14	55.5	1.62	11.1	9.12
750	24	4.51	0.11	5	5.7	3100	14	58.0	1.72	12.2	9.52
740	23	4.65	0.11	5	7.19	3200	15	60.6	1.82	13.4	9.92
731	23	4.80	0.11	4	7.41	3300	15	63.3	1.92	14.6	10.33
722	22	4.94	0.12	4	8.3	3400	16	66.0	2.02	15.9	10.74
713	22	5.09	0.13	4	8.26	3500	16	68.9	2.13	17.2	11.16
715	21	5.23	0.13	4	8.49	3600	17	71.8	2.24	18.7	11.59
707	21	5.38	0.14	4	9.13	3700	18	74.9	2.35	20.2	12.03
699	20	5.52	0.14	4	9.37	3800	...	78.0	2.46	21.8	12.47
691	20	5.67	0.15	3	10.2	3900	...	81.2	2.58	23.5	13.92
683	19	5.81	0.16	3	10.28	4000	...	84.4	2.70	25.3	13.38
675	19	5.96	0.16	3	10.54	4100	...	87.7	2.83	27.2	13.84
667	18	6.11	0.17	3	11.21	4200	...	91.0	2.96	29.3	14.31
659	18	6.25	0.17	3	11.49	4300	...	94.4	3.10	31.5	14.78
651	17	6.40	0.18	3	12.17	4400	...	97.9	3.24	33.7	15.26
643	17	6.54	0.19	3	12.46	4500	...	101.5	3.38	36.1	15.76
635	16	6.69	0.20	3	13.16	4600	...	105.1	3.52	38.8	16.26
627	16	6.83	0.20	3	13.47	4700	...	108.8	3.67	41.7	16.78
619	15	6.98	0.21	3	14.18	4800	...	112.6	3.82	44.9	17.30
612	15	7.13	0.22	2	14.50	4900	...	116.5	3.97	48.3	17.84
605	15	7.27	0.23	2	15.23	5000	...	120.4	4.12	52.4	18.38

Range Table for 12-pr. B.L. Gun, Mark IV.

Based on Practice of 29,300.

Dated 2.5.1900.

Charge, { weight, 12½ oz.
gravimetric density, 90·05
nature, cordite, size 5.

Projectile, { nature, shrapnel shell, Mark V.
weight, 12½ lb.

Muzzle velocity, 1,585 f.s.

Nature of mounting, travelling, field,
Mark IV.

Jump, + 40 minutes.

Remaining velocity. f.s.	Slope of descent. 1 in	5 minutes' elevation or deflection alters point of impact.		Deflection for drift (Telescope sight).	Elevation. ° ' "	Range. yds.	Fuze scale for time and percussion fuze, No. 56, Mark IV.	50 per cent. of rounds should fall in			Time of flight. secs.
		Range. yds.	Verti- cally or laterally. yds.					Length. yds.	Breadth. yds.	Height. yds.	
1518	343	63	0·14	...	0 32	100	...	...	...	...	0·20
1157	163	62	0·29	...	0 24	200	...	...	...	...	0·41
1401	107	61	0·43	1	0 16	300	...	...	...	...	0·62
1351	81	60	0·58	1	0 8	400	...	...	...	...	0·84
1207	63	59	0·72	1	0 0	500	1½	20·0	0·25	0·3	1·07
1264	53	58	0·87	1	0 8	600	2	20·5	0·30	0·4	1·30
1234	44	56	1·01	2	0 16	700	2½	21·0	0·37	0·4	1·54
1203	38	54	1·16	2	0 25	800	3	21·5	0·45	0·5	1·79
1175	33	52	1·31	2	0 34	900	3½	22·0	0·52	0·6	2·04
1149	29	50	1·45	3	0 44	1000	4	22·5	0·60	0·7	2·30
1124	26	48	1·60	3	0 54	1100	4½	23·0	0·67	0·8	2·56
1100	23	46	1·74	3	1 4	1200	5	23·5	0·75	1·0	2·83
1077	21	44	1·89	3	1 15	1300	5½	24·0	0·82	1·1	3·11
1056	19	42	2·03	4	1 27	1400	6	24·6	0·90	1·2	3·39
1036	17	40	2·18	4	1 39	1500	6½	25·2	0·97	1·4	3·68
1017	16	39	2·32	4	1 51	1600	7	25·8	1·05	1·6	3·98
999	15	38	2·47	5	2 4	1700	7½	26·4	1·12	1·8	4·28
982	14	37	2·61	5	2 17	1800	8	27·1	1·20	2·0	4·59
966	13	36	2·76	5	2 31	1900	8½	27·8	1·27	2·2	4·90
951	12	35	2·91	6	2 45	2000	9	28·6	1·35	2·4	5·21
937	11	34	3·05	6	2 59	2100	9½	29·4	1·42	2·7	5·52
923	10	33	3·20	6	3 14	2200	10	30·3	1·50	3·0	5·84
910	10	32	3·34	7	3 29	2300	10½	31·2	1·58	3·3	6·17
897	9	31	3·49	7	3 45	2400	11	32·1	1·66	3·6	6·50
885	9	30	3·63	8	4 1	2500	11½	33·1	1·74	4·0	6·84
873	8	29	3·78	8	4 18	2600	12	34·2	1·83	4·4	7·18
862	8	28	3·92	9	4 35	2700	12½	35·4	1·92	4·8	7·53
851	7	28	4·07	9	4 52	2800	13	36·7	2·02	5·3	7·88
840	7	28	4·21	10	5 9	2900	13½	38·1	2·13	5·8	8·24
829	6	27	4·36	10	5 27	3000	14	39·5	2·24	6·3	8·60
818	6	27	4·51	11	5 45	3100	14½	41·1	2·37	6·9	8·97
808	6	26	4·65	11	6 4	3200	15	42·8	2·50	7·5	9·34
798	5	26	4·80	12	6 23	3300	15½	44·0	2·65	8·2	9·72
788	5	25	4·94	12	6 42	3400	16	46·4	2·81	8·9	10·10
778	5	25	5·09	13	7 2	3500	16½	48·4	2·99	9·6	10·49
768	5	25	5·23	13	7 22	3600	17	50·5	3·19	10·4	10·89
759	5	24	5·38	14	7 42	3700	17½	52·7	3·39	11·2	11·29
750	4	24	5·52	14	8 3	3800	18	55·0	3·60	12·0	11·70
742	4	23	5·67	15	8 25	3900	18½	57·5	3·83	12·9	12·12
734	4	23	5·81	16	8 47	4000	19	60·1	4·08	13·9	12·54
726	4	22	5·96	16	9 8	4100	...	62·9	4·34	15·0	12·97
718	4	22	6·11	17	9 32	4200	...	65·9	4·61	16·1	13·41
710	4	21	6·25	17	9 55	4300	...	69·1	4·90	17·2	13·86
702	4	21	6·40	18	10 19	4400	...	72·5	5·20	18·7	14·31
694	4	20	6·54	19	10 43	4500	...	76·1	5·53	20·2	14·77

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RANGE TABLE FOR 12-PR. B.L. GUN, MARK IV—continued.

Remaining velocity.	Slope of descent.	5 minutes' elevation or deflection alters point of impact.		Deflection for drift (Telescopic sight).	Elevation.	Range.	Fuze scale for time and percussion fuze, No. 56, Mark IV.	50 per cent. of rounds should fall in			Time of flight.
		Range.	Vertically or laterally.					Length.	Breadth.	Height.	
f.s.	1 in	yds.	yds.	'	° '	yds.		yds.	yds.	yds.	secs.
686	4	20	6.69	20	11 8	4600	...	79.7	5.87	21.7	15.23
678	4	19	6.83	20	11 34	4700	...	83.5	6.23	23.4	15.70
671	4	19	6.98	21	12 1	4800	...	87.4	6.60	25.2	16.17
663	3	18	7.13	22	12 29	4900	...	91.6	7.00	27.0	16.65
656	3	18	7.27	23	12 58	5000	...	96.0	7.41	28.9	17.14
648	3	17	7.42	24	13 27	5100	...	100.6	7.83	31.0	17.64
641	3	17	7.56	25	13 57	5200	...	105.3	8.27	33.3	18.16
633	3	16	7.71	26	14 28	5300	...	110.1	8.73	35.7	18.70
626	3	16	7.85	27	15 0	5400	...	115.0	9.21	38.2	19.26
618	3	15	8.00	28	15 33	5500	...	120.1	9.72	41.3	19.83
611	3	15	8.14	29	16 6	5600	...	125.3	10.25	44.5	20.42
604	3	15	8.29	30	16 40	5700	...	130.6	10.82	47.9	21.03
597	3	14	8.43	31	17 14	5800	...	136.0	11.40	51.4	21.65
590	3	14	8.58	32	17 49	5900	...	141.5	12.02	55.1	22.27
584	3	14	8.73	33	18 24	6000	...	147.0	12.65	58.8	22.90

MEKOMETERS.

For information concerning Mekometers, see Equipment Regulations, Part I.; Regulations for Magazines and the Preservation of War Matériel; and the Mekometer Handbook.

SECTION GUN DRILL.

12-pr. B.L. Guns, Marks I to IV.

Battery gun drill, which does not vary with the equipment, is given in "Field Artillery Drill."

The following paragraphs give the duties of the detachments at the section commander's orders.

Single detachments should be accustomed to drill as if forming part of a section, and the instructor should therefore always use the orders given for the section commander.

On dismounted parades the detachment will form "Detachment Rear" where it is laid down for them to mount, and 6, 7, 8, and 9 will attend to the limber, 6 and 7 pushing in rear, 8 and 9 at the pole.

ARRANGEMENT.

THE DETACHMENT—

To tell off.

Detachment rear.

To form detachment rear in action.

To take post from detachment rear in action.

To move the gun with drag ropes.

" " without "

PREPARATION FOR ACTION.

ACTION.

DUTIES—

Wagon supply.

Casualties.

Signals.

TO FIRE—

Miss fire.

TO LOAD.

MAGAZINE FIRE.

CASE.

TO STAND FAST.

TO CEASE FIRING.

TO LIMBER UP.

INDIRECT LAYING—

One aiming post.

Two " posts.

MOUNTING AND DISMOUNTING—

To dismount the gun and carriage.

To mount " " " "

DISABLED ORDNANCE—

To replace a damaged wheel.

To remove a gun and carriage by a limber.

" " " " " wagon.

METHOD OF DRILLING RECRUITS.

THE DETACHMENT.

On mounted parades, as long as limbered up, **1** remains mounted on the left of the leaders—he does not dismount when the *detachment* is ordered to do so.

The detachment consists of nine numbers, who fall in two deep, one pace between ranks, **1** on the right of the front rank.

TO TELL OFF.

<u>Section Commander</u>	|	<u>No. 1.</u>
....Section—Tell Off.		

At the order from the section commander—1 numbers **1**; the right hand man of the rear rank numbers **2**; the right hand man of the front rank **3**; the second man from the right of the rear rank **4**; his front rank man **5**; and so on.

DETACHMENT REAR.

Formed as above, 3 yards in rear of the gun wheels, **1** covering the off wheel.

TO FORM DETACHMENT REAR IN ACTION.

<u>Section Commander.</u>	|	<u>No. 1.</u>
....Section—Detachment Rear.		No..... Double March.

At the order from the section commander—1 doubles to his place and gives the order "Double March."

*At the order from 1—*The numbers double into their places on the left of **1** each halting as he reaches his place.

TO TAKE POST FROM DETACHMENT REAR IN ACTION.

<u>Section Commander.</u>	|	<u>No. 1.</u>
....Section—Take Post.		No..... Double March.

*At the order from 1—*All the numbers double to their places.

TO MOVE THE GUN WITH DRAG ROPES.

<u>Section Commander.</u>	|	<u>No. 1.</u>
....Section—with drag ropes, Prepare to Advance.		

At the order from the section commander—2 and **3** hook the drag ropes to the gun wheel washers, the two highest numbers go to the pole, and the remainder man the ropes.

TO MOVE THE GUN WITHOUT DRAG ROPES.

<u>Section Commander.</u>	|	<u>No. 1.</u>
....Section—without drag ropes, Prepare to Advance.		

At the order from the section commander—2 and **3** push between the muzzle and wheels; **4** and **5** man the gun wheels; the two highest numbers go to the pole, and the remainder assist.

PREPARATION FOR ACTION.

MARK I GUN.

<u>Section Commander.</u>	<u>No. 1.</u>		
... Section—Prepare for Action.	No.	Percussion Load.	Shrapnel

At the order from the section commander—1 and the detachment dismount and—

1 sees that the bore is clear, gives the order to load, and superintends the other numbers.

2 fills the tube pocket, places a tube in the vent, and examines the brake and the shell pocket.

3 removes the breech cover * and straps it on the axle, examines the breech fittings, loads (ramming home himself), sees that the fuze key is in its pocket on the tensile stay, and examines the brake and the shell pocket.

4 removes the cover of the telescopic sight bracket and straps it on the tensile stay, and examines the sights and elevating gear.

5 sees that the fuze keys are in their pockets and examines the limber boxes.

The wagon numbers see that the fuze keys are in their pockets, and examine the wagon boxes. 6 supplies 3 with one round of shrapnel.

On the completion of the above the detachment mount without further order.

The numbers detailed to "examine" the various ammunition boxes see that they are properly filled, and that the fuzes of all shrapnel are set at "1 $\frac{3}{4}$," and the becketts of the safety pins looped over the nuts of the fuzes;† also that the lids open easily and the locks are in good order. Any deficiencies in the limber boxes are filled up from the wagon body under the direction of 1.

When shell are carried fuzed, all covers will be removed from the cartridges at the same time that the shell are fuzed.

The lanyards of all the fuze keys should be attached to the leather loops inside the fuze key pockets.

If the order "*Telescopic Sights*" is given, 4 takes the case containing the telescopic sight out of the box on the limber, and slings it over his shoulder. He puts it back at "Cease Firing."

If the section commander orders "*Without Loading—Prepare for Action*," or "*With Case—Prepare for Action*," the duties are carried out with the necessary alterations.

At drill, rounds will not be loaded: but service shell, fuzed with drill fuzes, will be placed in succession as they are used on the ground on the left of the gun. The end of the handspike will be placed against the base of the hood in the action of "ramming home." Rounds will be returned to their proper place at the conclusion of the series on the order "Replace ammunition."

* In very sandy soil the battery commander may order the breech covers to be left on.

† Only when shell are carried fuzed. (See page 28.)

PREPARATION FOR ACTION.

MARK II TO IV GUNS.

<i>Section Commander.</i>	<i>No. 1.</i>
.... Section—Prepare for Action.	No. . . Percussion, Shrapnel—Lead.

At this order from the section commander—No 1 and the detachment dismount, and—

1 sees that the bore is clear, gives the order to load, and superintends the other numbers.

2 removes the breech cover * and straps it to the stays on the right side, fills the tube box, examines the breech fittings, axletree box, brake and spade, and places a tube in the vent.

3 removes the cover of the telescopic sight bracket and straps it on the tension link, examines the axletree box, brake and spade, and sees that the sights and elevating gear are in good working order.

4 takes the fuze key from the pocket on the tensile stay, places the lanyard round his neck and the key in the breast of his jacket, loads, ramming home himself.

5 sees that the fuze keys are in the pockets on the limber and examines the limber boxes.

The wagon numbers see that the fuze keys are in their pockets and examine the wagon boxes; 6 supplies 4 with one round of shrapnel.

On the completion of the above the detachment mount without further order.

The numbers detailed to "examine" the various ammunition boxes see that they are properly filled, that the fuzes are set at "13", (1½ with Mark IV guns), and that the beackets of the safety pins are looped over the nuts of the fuzes†; also that the lids open easily and the locks are in good order. Any deficiencies in the limber boxes are filled up from the wagon body under the direction of 1.

When shell are carried fuzed, all covers will be removed from the cartridges at the same time that the shell are fuzed.

The lanyards of all keys should be attached to the leather loops inside their pockets.

If the order "*Telescopic Sights*" is given, 3 takes the case containing the telescopic sight out of the box on the limber, and slings it over his shoulder. He puts it back at "Cease Firing."

If the section commander orders "*Without Loading—Prepare for Action*," or "*With Case—Prepare for Action*," the duties are carried out with the necessary alterations.

At drill, rounds will not be loaded; but service shell, fuzed with drill fuzes, will be placed in succession as they are used on the ground on the right of the gun. The end of the rammer will be placed against the base of the hood in the action of "ramming home." Rounds will be returned to their proper place at the conclusion of the series on the order "Replace ammunition."

* In very sandy soil the battery commander may order the breech covers to be replaced after loading.

† Only when shell are carried fuzed.

ACTION.

<u>Section Commander.</u>	<u>No. 1.</u>
Section—Action Front.	No. . . . Action Front.

At the order from 1—

The detachment dismount, 3 unkeys, and with 2 lifts the trail; when the trail is clear of the hook, 3 gives "Limber drive on."

2 and 3 carry the trail round half a circle to the left, 2 shifting round the trail eye to avoid walking backwards, and lower it to the ground.

4 and 5 man the wheels.

The limber moves as detailed in Field Artillery Drill.

MARK I GUN.

As soon as the trail has been lowered to the ground—

1 ships the handspike, lays for direction, and points out the target to 4.

2 puts on the brake, takes the lanyard out of the tube pocket and holds it with the hook in his left hand, the extractor in his right.

3 puts on the brake.

4 sets his sight as ordered, and lays for elevation. As soon as the gun is layed he holds up his hand. He should remain in position until the signal "Make ready" is given, but should not weary his eye by looking over the sights.

5 fills the portable magazines with shrapnel, removing the beackets of the safety pin from over the nuts of the fuzes; if wagon supply is ordered, he takes post 10 yards in rear of the gun until the arrival of the wagon.

6 assists 5, and takes a portable magazine up to the gun as soon as one is ready, placing it near 3, but clear of the recoil.

The positions of the numbers are as follows:—

1 one yard in rear of the trail eye.

2 and 3 close to and facing the breech.

4 on the right of the trail eye.

5 in rear of the limber on the off side.

6 in rear of the limber on the near side.

MARK II TO IV GUNS.

As soon as the trail is lowered to the ground—

1 ships the handspike, places the rammer under his left arm, lays for direction, and points out the target to 3.

2 lowers the spade if the keep pin is on the right side, unfastens the hasp of the axletree box, adjusts the brake, and steps clear of the recoil.

3 lowers the spade if the keep pin is on the left side, unfastens the hasp of the axletree box, takes out the lanyard, attaches the hook to the tube, holding the extractor in his right hand, sets his sight as ordered, and lays; as soon as the gun is layed he holds up his hand.

4 brings up a tray of ammunition, places it on the right side in line with the trail handle, clear of the wheel, and supplies himself with a fresh round of ammunition.

5 opens the ammunition box, withdraws a tray of ammunition, removes the beackets of the safety pins from over the nuts of the fuzes.

6 supplies 4 with trays of ammunition.

If "Wagon Supply" is ordered, 4 and 5 take post 10 yards in rear of the gun until the arrival of the wagon.

The position of the numbers is as follows:—

- 1 one yard in rear of the trail eye.
- 2 clear of the recoil in line with the breech on the right side (except when actually attending to the breech).
- 3 close to the breech on the left side.
- 4 in line with the trail handle on the right side.
- 5 in rear of the limber on the off side.
- 6 in rear of the limber on the near side.
- All the numbers face the front.

DUTIES.

MARK I GUN.

1. Commands, attends to the handspike, sees that the time fuzes have been set correctly, rams home, and lays for direction.

He is responsible for the entire service of his gun.

While in action he will pay particular attention to the following points:—

That the gun is in the general alignment of the battery.

That the shell pockets are filled up, and that their lids are kept closed and fastened.

Should a case arise in which it is desirable that 1 should lay, he will perform the duties of 4, with the addition of "commands and sees that the time fuzes have been set correctly," 4 performing 1's duties with the above exceptions.

He lays for direction by looking along the line given by the elevating screw, cam lever, and muzzle, while standing at the end of the handspike, not by looking over the sights. When, however, great accuracy of line is of importance, the laying for direction will be done by 4, in which case 1 will traverse according to 4's signals.

He only gives the words of command shown for him; he does not repeat the section commander's orders. His executive orders should be no louder than is necessary for his subdivision to hear.

2. Attends to the brake, shell pocket and vent, fires, and mans the wheel.

He must take every opportunity, after coming into action, of filling up the axletree box, if any rounds have been taken from it; this must be done without interrupting the service of the gun.

He must stand clear of the layer when telescopic sights are used.

3. Attends to the brake, shell pocket, and breech, supplies himself with ammunition from the portable magazine, or, if one has not been brought up, from the shell pocket, placing the cartridge under his left arm until he has loaded the shell; sets time fuzes during ranging, shows them to 1, takes out safety pin or pins, loads, and mans the wheel.

He opens and closes the breech as follows:—

To Open the Breech.—He takes hold of the cam lever with his right hand, raises it to its full extent, draws it towards him as far as it will go, and folds it down and then throws the breech open.

To Close the Breech.—He takes hold of the cam lever with his right hand, raises it to its full extent, and swings the breech-screw round until the carrier ring is flush against the breech of the gun. Still keeping the lever raised, he pushes the screw home, and then forces the lever from him as far as it will go and folds it down. If the breech-screw will not turn, he starts it back by lowering the cam lever slightly, then forces the lever from him as far as it will go, and folds it down.

He must take every opportunity, after coming into action, of filling up the axletree box if any rounds have been taken from it; this must be done without interrupting the service of the gun.*

4. Lays for elevation and lifts at the handspike in running up or back.

The position for the layer is detailed in Field Artillery Drill. Straddling the trail interferes with the laying of the handspike number, and is an incorrect position.

4 must keep the gun layed for elevation whether loaded or not; he must remember to look over the sights after the loading is completed, to see that the gun has not been shifted. He must always *depress* last.

As a general rule the whole of the laying for direction will be done by 1, but when great accuracy of line is of importance 4 will lay for direction also, using the signals given at page 45.

If through casualties there are no N.C.O.'s left in the detachment, 4 will command, and see that the time fuzes have been set correctly, in addition to his other duties.

5. Fills the portable magazines, removing the beekets of the safety pins from over the nuts of the fuzes, he sets fuzes after the ranging is completed.

At "Magazine Fire," he will, alternately with 6, supply single rounds of ammunition.

6 Supplies 3 with ammunition in the portable magazines, and assists 5.

As a general rule only one portable magazine should be at the gun at a time, so that if change of fuze, &c., is ordered it may be immediately carried out by 5 and 6.

When firing at a moving target, the second round of time shrapnel having been prepared at the limber or wagon, is at once taken up by 6, and shown by him to 1. 6 then stands ready to hand it to 3 when required.

At "Magazine Fire," he will, alternately with 5, supply single rounds of ammunition.

Except when it is otherwise ordered, the numbers work on their own sides of the gun, even numbers on the right side, odd numbers on the left.

Note.—On no account should a fuze without a safety pin be placed in any ammunition box.

MARKS II TO IV GUNS.

1 commands, attends to the handspike, sees that the time fuzes have been set correctly, runs home on the right side of the trail and lays for direction.

He is responsible for the entire service of his gun.

* Although Nos. 2 and 3 are thus responsible that the axletree boxes are kept filled, 1 should order 6 to bring up single rounds fuized at 1 $\frac{1}{2}$ as opportunity offers, without interfering with the service of the gun in action.

While in action he will pay particular attention to the following points: —

That the gun is in the general alignment of the battery.

That the axletree boxes are filled up and that their hasps are unfastened in action and fastened at cease firing.

Should a case arise in which it is advisable that 1 should lay, he will perform the duties of 3, with the addition of "Commands, and sees that time fuzes have been correctly set," 3 performing 1's duties with the above exception.

He lays for direction by looking along the line given by the elevating screw and muzzle while standing at the end of the hand-spike, not by looking over the sights. When, however, great accuracy of line is of importance, the laying for direction will be done by 3, in which case 1 will traverse according to 3's signals.

He only gives the words of command shown for him; he does not repeat the section commander's orders; his executive orders should be no louder than is necessary for his subdivision to hear.

2 attends to the spade, axletree box, breech fittings, and brake when required, and mans the wheel if necessary.

He must take every opportunity, after coming into action, of filling up the axletree box, if any rounds have been taken from it; this must be done without interrupting the service of the gun.*

He opens and closes the breech as follows:—

To open the breech.—He takes hold of the lever with his left hand and swings the breech screw open.

To close the breech.—He takes hold of the lever with his left hand and pushes it from him as far as it will go.

3 attends to the spade and axletree box, lays, fires, and mans the wheel if necessary.

He must take every opportunity, after coming into action, of filling up the axletree box if any rounds have been taken from it; this must be done without interrupting the service of the gun.*

4 supplies himself with ammunition from the tray, placing the cartridge under his left arm, sets time fuzes during ranging, and re-sets them when a change of fuze has been ordered during "battery fire," until a fresh tray has been supplied, shows fuzes to 1, takes out safety pin or pins, and loads.

5 withdraws trays, removes beackets of safety pins from over the nuts of the fuzes, sets fuzes after the ranging is completed.

At magazine fire he will, alternately with 6, supply 4 with trays of ammunition.

6 Supplies 4 with trays of ammunition, and assist 5 in his duties.

When firing at a moving target, the second round of time shrapnel having been prepared at the limber or wagon, is at once taken up by 6, shown by him to 1, and handed to 4.

Except when it is otherwise ordered, the numbers work on their own sides of the gun, even numbers on the right side, odd numbers on the left.

Note.—On no account should a fuze without a safety pin be placed in any ammunition box.

* Although 2 and 3 are thus responsible that the axletree boxes are kept filled, 1 should order 6 to bring up single rounds, fuze at 1 $\frac{1}{4}$ (or 1 $\frac{1}{2}$) as opportunity offers, without interfering with the service of the gun in action.

WAGON SUPPLY.

One wagon for each section is brought up as detailed in Field Artillery Drill.

As soon as the wagon halts, the 5's of the two guns of the section go to the wagon body and issue ammunition to their respective guns as above detailed.

The numbers brought up on the wagon first unhook the wheel horses; when the team is unhooked, 6 on the near side gives the order "drive on," and then performs the duties detailed for 6 to the two guns of the section—the numbers on the off side of the wagon to the right gun, those on the near side to the left gun. If there are six numbers with the gun, no men should be sent up on the wagon.

At standing gun drill without wagons, 7, 8 and 9 stand 5 yards in rear of the limber.

CASUALTIES.

The captain is responsible for the replacement of casualties as directed in Field Artillery Drill. Section commanders order such changes of duties in their sections and detachments as they consider necessary. If full detachments cannot be maintained, the duties are divided as follows:—

With five numbers.—5 performs the duties of 5 and 6.

With four numbers.—2 performs the duties of 5 and 6, with Mark I Gun, 4 performs the duties of 2 and 4, with Marks II–IV Guns, 1 performing the duties of 2 in addition to his own.

With three numbers.—1 loads and performs the duties of 2; 2 performs the duties of 4, 5, and 6, except loads; 3 no change. (2's position should be behind the limber, setting fuzes, unless he has sufficient ready; in which case he should remain at the gun, draw pins, and hand shell to 1.)

SIGNALS.

Nature.	By whom given.		Meaning.
	Mark I gun.	Marks II–IV guns.	
Either hand raised above his head ..	4	3	My gun is layed.
Motion with the palm of either hand in } the required direction, arm well back }	4*	2*	Trail right, or left.
Drops his hand	4*	3*	Halt (traversing).
Points to the vent with his right hand..	1	---	Make ready.

* Only when, great accuracy for line being required, the laying for direction is done by 4 or 3.

TO FIRE.

No gun is ever to be fired without an *order* from **1**; and **1** must never give this order until he has received the order from the section commander and seen that the gun is in all respects ready.

MARK I GUN.

<i>Section Commander.</i>	<i>No. 1.</i>
Fire No.... Gun.	Points to the vent. No. Fire.

At the order from the section commander—1 steps clear of the recoil to the left and points to the vent with his right hand.

At the signal from 1—

2 hooks the lanyard to the tube, steps outside the wheel, and stands facing to the front, holding the lanyard tight with his right hand, the forearm across the body, and the elbow so bent that the hand is level with the vent.

3 and **4*** step clear of the recoil.

As soon as he sees **2** ready and the other numbers clear, **1** gives the order, "No. Fire."

At the order from 1—2 slews his body to the right, and thus fires the gun; he then places the lanyard round his neck, the hook end hanging down on his left side, the extractor on his right.

Directly the gun stops in its recoil it is run up to its previous position without any order.

1 assists if he considers it necessary.

2 and **3** man the wheels.

4 lifts at the handspike.

As soon as the gun is run up—

1 lays for direction.

2 takes out the tube.

3 opens the breech and supplies himself with a fresh round of ammunition.

4 lays for elevation.

MISS-FIRE.

If there is a miss-fire† after an interval of 10 seconds the detachment resume their positions, the tube is extracted, a new one put in, and the gun is fired when ordered.

MARKS II-IV GUNS.

<i>Section Commander.</i>	<i>No. 1.</i>
Fire No.... Gun.	No.... Fire.

At the order from the section commander—

1 steps clear of the recoil on the left side and gives the number of his gun as a caution.

* When using telescopic sights, **4** must remove the sight before stepping clear. Until new pattern sights are issued he must also do this with the tangent sight.

† It is not a miss-fire if the wire breaks and the friction bar is *not* withdrawn.

At the caution from 1—

- 3 steps clear of the recoil, holding the lanyard in his right hand.
- 1 then gives "Fire."
- 3 fires the gun by jerking the lanyard smartly.
- As soon as the gun stops in its recoil—*
- 1 lays for direction.
- 2 opens the breech and inserts a new tube.
- 3 lays for elevation.

MISS-FIRE.

If there is a miss-fire: † after an interval of 10 seconds, the detachment resume their positions, the tube is extracted, a new one put in, and the gun is fired when ordered.

LOAD.

<i>Section Commander.</i>	<i>No. 1.</i>
.... Section—Shrapnel Fuze— Load.†	No. Shrapnel Fuze—Load.‡

MARK I GUN.

At the order from 1—

2 takes the lanyard from round his neck and holds it ready, the hook in his left hand, the extractor in his right.

3 sets the time fuze (when ranging), shows it to 1, takes out the safety pin or pins and places the shell in the bore.

As soon as he sees that 3 is ready to load—

1 takes the handspike in the centre with his left hand back up, withdraws it from the socket, cants it over unshod end next the gun, meeting it with his right hand back up, takes a pace to the front with his left foot, and placing the unshod end against the shell, rams it gently home; then *keeping the handspike against the shell*, he applies his whole force to ensure its being true home.§ He then steps back and replaces the handspike in the socket.

As soon as the shell has been rammed home—

3 places the cartridge in the chamber, closes the breech, and holds up the cam lever, whilst 2 inserts a tube.

MARKS II-IV GUNS.

At the order from 1—

4 sets the fuze (when ranging), shows the fuze to 1, takes out the safety pin or pins, and places the shell in the bore.

As soon as 4 is ready to load—

1 steps in on the right of the trail, and rams the shell home § with his right hand; he then steps back, placing the rammer under his left arm.

† It is not a miss-fire if the wire breaks, and the friction bar is *not* withdrawn.

‡ Or "Percussion Shrapnel Load."

§ In the event of a shell jamming in the bore during loading, a cartridge will be cut shorter (by order of the section commander), and the shell blown out.

As soon as the shell has been rammed home—

4 places the cartridge in the chamber.

2 closes the breech.

3 hooks the lanyard to the tube. At battery fire he should examine his sight after every round, to see that the elevation is correct.

MAGAZINE FIRE.

<i>Section Commander.</i>		<i>No. 1.</i>
.... Section—Magazine Fire.		

MARK I GUN.

At the order from the section commander—

4 lays for elevation by placing two fingers over the tangent sight† which is run down in the socket.

The guns are reloaded with shrapnel, fuze $1\frac{3}{4}$, as soon as fired without any further order.

5 and **6** alternately supply **3** with single rounds of shrapnel fuze $1\frac{3}{4}$, from the limber or wagon.

The gun is not run up between rounds unless necessary.

3 should not show the time fuzes to **1**.

MARKS II-IV GUNS.

At the order from the section commander—

3 for elevation by placing three fingers over the drum of the sight, laying over the top of his fingers and the acorn of the fore sight.

5 and **6** alternately supply **4** with trays of ammunition as required; all fuzes being set at $1\frac{3}{4}$ (or $1\frac{1}{2}$ with Mark IV gun).

4 should not show the fuzes to **1**.

CASE.

<i>Section Commander.</i>		<i>No. 1.</i>
.... Section—Case.		

MARK I GUN.

This is exactly the same as above, substituting case for shrapnel, fuze $1\frac{3}{4}$; as soon as the last case in the limber or wagon has been supplied to **3**, the numbers at the limber or wagon set shrapnel fuzed at 0, and supply them in the same way as case.

MARKS II-IV GUNS.

This is exactly the same as above, substituting case for shrapnel, fuze $1\frac{3}{4}$ (or $1\frac{1}{2}$ with Mark IV gun).

† As in most cases the left tangent sight will be already run down in the socket, time will be saved by using it.

As soon as the last case in the limber or wagon has been supplied to **4**, the numbers at the limber or wagon set shrapnel fuzes at 0, and supply them in the same way as case. When shrapnel fuzed at 0 are used the gun should be layed for elevation with *two* fingers over the drum of the sight, laying over the top of the fingers and the acorn of the fore sight.

TO STAND FAST.

<i>Section Commander.</i>	<i>No. 1.</i>
.... Section—Stand Fast.	

MARK I GUN.

At the order from the section commander—

All stand fast, whatever they are doing, except that **2** unhooks the lanyard if it is hooked to the tube, and that if a safety pin has been taken out, **3** places the shell in the bore.

At the order "*Go on*" the work is continued.

MARKS II-IV GUNS.

At the order from the section commander—

All stand fast, whatever they are doing, except that **3** unhooks the lanyard, if it is hooked, and that if a safety pin has been taken out, **4** places the shell in the bore.

At the order "*Go on*," the work is continued.

TO CEASE FIRING.

<i>Section Commander.</i>	<i>No. 1.</i>
.... Section—Cease Firing.	No. Percussion, Shrapnel— Load.

MARK I GUN.

At the order from 1—

The guns are loaded, and each number, *as soon as he has performed his share of the loading*, proceeds as follows:—

1 straps the handspike on the trail.

2 takes off the brake, puts the lanyard into the tube pocket, and sees that the axletree box is properly shut.

3 takes off the brake and sees that the axletree box is properly shut.

4 places the telescopic sight (if it is in use) in its case, and returns the case to the box on the limber.

5 and **6** strap the portable magazines in their places without removing any ammunition that may be in them.

If the section commander orders "*Without Loading—Cease Firing*," or "*With Case—Cease Firing*," the duties are carried out with the necessary alterations.

With the Mark I* carriage the left tangent sight should not be run down in its socket, but clamped at 1,500 yards.

MARKS II-IV GUNS.

At the order from 1—

The guns are loaded, and each number, *as soon as he has performed his share of the loading*, proceeds as follows:—

1 secures the handspike and the rammer on the trail.

2 assists 3 to raise the spade,* and secures it if the keep pin is on the right side, sees that the axletree box is properly shut, and adjusts the brake.

3 assists 2 to raise the spade,* and secures it if the keep pin is on the left side, replaces the lanyard, and sees that the axletree box is properly shut. If necessary the gun is run forward to free the spade.

5 and 6 replace unexpended ammunition and close the ammunition boxes,† but will not delay the limbering up by resetting fuzes at 1 $\frac{3}{4}$; this however should be done at the earliest opportunity.

If the section commander orders "Without Loading," or "With Case—Cease Firing," the duties are carried out with the necessary alterations.

Note.—If for any reason it is impossible to fire the guns at "Cease Firing," the battery commander may order the cartridge to be withdrawn, and the shell left in the bore.

In cases where the time pin has been taken out before the order "Cease Firing" is given, the loading will be completed and the gun fired as if it had been loaded when the order was given.

In all cases on coming into action the brake blocks are to be brought close to the tires of the wheels to relieve the strain upon the rods when firing.

If the toggle brake is used as a firing brake the blocks should not be screwed up tight against the wheels, sufficient play should be allowed for traversing the gun, the toggle action will bring the brake into bearing when the gun is fired.

TO LIMBER UP.

<i>Section Commander.</i>	<i>No. 1.</i>
.... Section—Front Limber Up.	

At the order from the section commander—

2 and 3 carry the trail round half a circle to the right, 2 shifting round the trail eye to avoid walking backwards, and lower it to the ground.

4 and 5 man the wheels.

As soon as the trail is lowered the numbers get under cover—

1 in front of 2;
2 and 3 between breech and wheels;
4 and 5 " muzzle " ;
6 in front of 4;

the whole with their backs to the axletree.

The limber comes up as detailed in Field Artillery Drill, and 1 gives "Halt—Limmer Up."

At the order from 1—

2 and 3 lift the trail and place it on the hook.

3 keys up.

4 and 5 man the wheels.

On the completion of the above the detachment mounts without further order.

* To avoid cutting the wire rope through jamming, they will take hold of the wire rope with their inner hands, and the spade with their outer hands, when raising it.

† And replace empty trays, except on service.

Right, left, or rear limber up is the same except that at—

Right Limber up.—The trail is carried round a quarter of a circle only.

Left Limber up.—The trail is carried round a quarter of a circle to the left, **3** in this case shifting round the trail eye.

Rear Limber up.—The trail is not carried round.

The limber in all cases moves as detailed in Field Artillery Drill.

INDIRECT LAYING.

Aiming posts should be issued in pairs of the same colour, the right guns of sections having red, the left blue. They should be planted with their coloured sides towards the guns, except when, owing to light, &c., the section commander orders the white side.

ONE AIMING POST.

<i>Section Commander.</i>	<i>No. 1.</i>
.... Section—One Aiming Post.	

At the order from the section commander—

1, standing at the end of the handspike, directs **3** (**4** with Mark I gun) by signal to plant his aiming post in line with the target.

2 and **3** mark on the ground the position of the wheels.

3 (**4** with Mark I gun) doubles out about 50 yards to the front with one aiming post, which he plants as directed by **1**; he then doubles back and gets out his telescopic sight.

At "Go on," the firing is continued, the gun being laid for direction on the aiming post, and for elevation by the level on the telescopic sight.

When the target cannot be seen by the **1** dismounted, the section commander will direct whether he should mount or stand up on the limber; on cease firing the posts are brought in by **3** (**4** with Mark I gun) on the order "In aiming posts."

TWO AIMING POSTS.

<i>Section Commander.</i>	<i>No. 1.</i>
.... Section—Two Aiming Posts.	

At the order from the section commander, which is given when the battery is halted under cover, previous to occupying a position by the deliberate method—

3 (**4** with Mark I gun) gets out his aiming posts, and telescopic sight.

As soon then as the battery commander gives the signal (*see* Field Artillery Drill), the section commander and layers fall out in the usual way, but each layer carries his two aiming posts and telescopic sight instead of tangent sights.

The battery commander, after pointing out the target, shows the position of the rear post of the directing gun; the layers of the remaining guns extend along the alignment and drop, or stick in the ground their rear posts at the interval ordered.

Each layer, as soon as he has dropped, or stuck in his rear post, advances from 10 to 20 yards directly towards the target (keeping out of sight of the enemy as much as possible), and at once plants his front post upright in the ground. He then returns and plants his rear post in line with the front post and the target. He then takes up a position for his gun, out of sight of the target, and in line with his two posts, looking to the directing gun for his dressing; the guns should not be less than 50 yards from the rear aiming post.

The section commanders see that the layers and posts are properly placed before they double back to the battery.

Then when the battery commander gives the signal to advance, the battery is brought into action as detailed in Field Artillery Drill, Chapter III, Section 8 (ii). As however it is very important that the guns should be brought exactly into line with the two posts, it will usually save time if the battery is advanced at a walk and in such a manner that the guns may be brought into action "right" or "left."

2 and 3 mark on the ground the position of the wheels.

On cease firing the posts are brought in by 3 (4 with Mark I gun), on the order "In aiming posts."

MOUNTING AND DISMOUNTING.

This should only be practised at the annual course of military training, and then only sufficiently for instruction; every care must be taken that the equipment is not injured.

TO DISMOUNT THE GUN AND CARRIAGE.

<i>Section Commander.</i>	<i>No. 1.</i>
Dismount No. Gun and Carriage.	No. Prepare to Dismount the Gun. Dismount the Gun. Dismount the Carriage. Lift—Lower.

At the order "Prepare to Dismount the Gun"—

1 removes the sights, disconnects the elevating gear, runs it down. He then mans the handspike.

2 and 3 unkey the capsquares (remove the breech fittings with Marks II—IV guns) and man the wheels.

4 and 5 double two drag ropes and make fast the bights with a reef knot, half over and half under the breech, just in front of the sight socket; the running ends are then passed outside the tire of the wheels on the same level as the breech, two turns taken round the felloe, one on each side of a spoke to prevent slipping, and made fast with a half-hitch, blackwalling against the tire. 4 and 5 then man the wheels.

6 and 7 bring up the drag ropes to 4 and 5, and man the wheels.

8 and 9 bring up a 6-ft. handspike, place it in the bore and man it.

At the order "Dismount the Gun"—

8 and 9 lift the gun clear of the trunnion holes (2 and 3 moving the capsquares) while 2, 4, and 6, 3, 5, and 7, man the wheels forward until the gun is lowered to the ground. 1 raises the trail off the ground until the trunnions are clear.

At the order "Dismount the Carriage"—

2, 3, 4, and **5** go to the carriage **2** and **3** in rear, **4** and **5** in front.

6, 7, 8, and **9** go to the wheels, **6** and **7** in front. **8** and **9** in rear. **8** and **9** take off the linch pins and washers.

At the order "Lift"—The carriage is lifted, and the wheels taken off.

At the order "Lower"—The wheels are placed on the ground dish down, and the carriage is lowered to the ground.

TO MOUNT THE GUN AND CARRIAGE.

<i>Section Commander.</i>	<i>No. 1.</i>
Mount No. . . . Gun and Carriage.	No. . . . Mount the Carriage. Lift. Prepare to Mount the Gun. Mount the Gun.

This is exactly the opposite to the dismounting just described.

2 and **3** will not move the capsquares until the trunnions are about 6 inches from them.

Note.—Limbers and wagons are mounted and dismounted in a similar way, the poles having been previously removed.

DISABLED ORDNANCE.

Whenever operations are not described in detail or numbers are not told off to particular duties, **1** will order such duties to the several members as may be required.

TO REPLACE A DAMAGED WHEEL.

Should a gun wheel be disabled in action, it should be immediately turned so as to bring the sound portion on to the ground (the brake is put on with Mark II to IV guns), and notice should be sent to the captain.

The latter will immediately send up another wheel, which will be brought alongside the damaged one, and the wheels changed as follows:—

<i>Section Commander.</i>	<i>No. 1.</i>
No. . . . Change Wheels.	No. . . . Change Wheels. Lift. Lower

At the order "No. . . . Change Wheels" from 1—

6 brings up a 6-ft. handspike and hands it to **2**, or **3** (according to side).

1 and **6** go to the damaged wheel, **1** in rear. **6** removes the linch pin and washer.

2, 3, 4, and **5** man the handspike, which is placed under the axle-tree by **2** or **3**.

At the order "Lift"—

The axletree is lifted, and the damaged wheel is taken off. 6 rolls it out of the way, and the new wheel is put on by the numbers who brought it up.

At the order "Lower"—

The carriage is lowered, the linch pin and washer put on by 6, who also replaces the handspike, and all resume their duties in action.

The damaged wheel is either left on the ground or removed by the numbers who brought up the new one, as the captain may have directed.

TO REMOVE A GUN AND CARRIAGE BY A LIMBER.

The gun is dismounted, the horses taken out; the limber is run over the gun so that the breech is towards the pole, and the trunnions under the limber hook; the muzzle and pole are raised, and the gun slung with a drag rope round the trunnions to the limber hook; the end is passed to the front, and the muzzle borne down, a half-hitch taken round the breech, and made fast to the futchels.

The carriage is dismounted and turned over (projecting fittings, &c., being first removed). It is then lifted by all the numbers, trail first, up the front of the limber on to the top of the box, until the weight is balanced for draught.

The trail is secured by a drag rope to a handspike in the bore; the wheels are placed, dish down, on the top of the carriage, securely lashed with drag ropes to the futchels and limber hook in rear and to the draught hooks in front.

TO REMOVE A GUN AND CARRIAGE BY A WAGON.

The gun is slung to a limber as before. The carriage turned over (projecting fittings, &c., being first removed). It is then lifted by all the numbers on to the wagon body until the trail eye nearly touches the limber box; and is secured to the perch by a drag rope. The wheels are placed, dish down, on the top of the carriage, and lashed.

METHOD OF DRILLING RECRUITS.

GENERAL REMARKS.

Many good recruits are acquainted only with the commonest English words, and as their duties and the material they have to use are altogether new and strange, instructors should be careful—

To use the simplest language possible.

To explain, as they occur, all technical terms.

To illustrate descriptions by means of a piece of chalk or otherwise, and in all cases to render clear the object of the various duties.

Not to attempt to teach recruits elaborate descriptions, exact measurements, &c., which they do not understand.

To avoid needless repetitions, or wearying the men by keeping them for a long time at one thing; the drill should be varied by short descriptions (avoiding manufacturing details), setting fuzes, &c.

To bring men forward by successive steps, by explaining a position and then doing it; for instance, when commencing recruits' gun drill, the instructor should himself show how a duty should be performed, and then cause every man in turn to do that duty (make every man do 1's duty, then every man 2's, then 4's, and so on). When each man knows the duty of each post separately, the numbers who work and move together should be instructed after the manner described below, before commencing gun drill in quick time.

Great patience is necessary on the part of the instructor. He must make allowance for the different capacities of the recruits, and squads should periodically be arranged, so that the intelligent soldier may reap the advantage of his work, and not be kept back by those of inferior ability. Recruits, as they progress, should be called out in turn to drill, for this gives a man confidence, helps him to learn, and causes him to take an additional interest in his work.

The instructor should place himself where he can be seen and heard by all in the squad, should stand in a smart, soldierlike attitude, and should avoid pacing up and down, looking down on the ground, turning his back on the squad, and similar habits, which have the effect of fidgeting the men and distracting their attention.

His explanation should be given in a distinct voice; his word of command should be sharp and decisive.

Stress is laid on the above points because men unconsciously imitate their instructor. A first-rate instructor will make a good detachment; his manner and style are therefore of the first importance.

The utmost alertness of attitude and smartness of movement should be enforced throughout gun drill.

The instructor can at any time ascertain that each number is at his post by proving. This he does by calling out "*Prove your numbers — 1, 2, &c.*" The man called upon raises his right hand and extends it smartly to the front, hand open, thumb uppermost, hand as high as the shoulder. When the next number is called he drops his hand. The last number lowers his hand at the word "*Down.*"

If at any time the instructor wishes to change the numbers, he gives the order "*Change Rounds.*" On this, 1 becomes 9; 9, 8; 8, 7; 7, 6; 6, 5; 5, 4; 4, 3; 3, 2; 2, 1.

The following is only an example of how the drill should be taught; it being, of course, clearly understood that some of the details will vary with particular equipments.

The details of the other operations should be divided up in a similar manner.

TO FIRE.

At the order "*Fire No. . . . Gun*" from the section commander—

1 steps clear of the recoil to the left, and gives the number of his gun as a caution.

At the caution—

3 steps clear of the recoil, holding the lanyard in his right hand.

1 gives "*Fire.*"

3 fires by jerking the lanyard smartly.

"Fire No. . . . Gun"—

Next explain that as soon as the gun stops in its recoil—

1 lays for direction.

2 opens the breech and puts in a new tube.

3 lays for elevation.

1, 2, and 3 "*Go on.*"

List of Stores.
CARRIAGE, MARK I.*

Description.	No.	Where carried.
Bits, vent, 14-in.†	1	In fuze key pocket.
Box, T friction tubes	1	On top of trail.
Brushes, breech screw	1	In upper trail box.
Buckets, water, G.S., leather ..	2	On axletree.
Cans, lubricating, No. 9	1	In lower trail box.
Caps, sponge, No. 6	2	On cleaners.
Cartridges, 12 $\frac{7}{16}$ oz. cordite, size 5 ..	4	Two in each axletree box.
Cleaners { pinsaba	1	On left tensile stay.
{ wool	1	On right tensile stay.
Covers { breech	1	On breech of gun.
{ telescopic sight bracket ..	1	On sight bracket.
Cutter, wire	1	In pocket on brake arm, right side.
Hammers, claw, 20 oz.	1	In upper trail box.
Handspikes, traversing, No. 2, Mark II.	1	On top of trail.
Keys, fuze, universal	1	In pocket on left tensile stay.
Lanyards, T	2	1 in right axletree box, 1 in pocket on shaft of brake gear.
Oil, Rangoon	1	In oil can.
Pincers, carpenters'	1	In upper trail box.
Posts, aiming	2	On left side.
Pockets { key, fuze, universal	1	On left tensile stay.
{ lanyard	1	On right brake shaft.
Rimers, vent, T	1	In fuze key pocket.
Rods, vent, 14-in., Mark I.†	1	
Shells, shrapnel	2	In left axletree box.
Shot, case	2	In right " " "
Spanners, McMahon, 15-in.	1	In upper trail box.
Tampon	1	Strapped on right side of axletree, except in gun park (vide p. 27).

LIMBER (CARRIAGE AND AMMUNITION WAGON) Mark I.

Axes { felling	1	Under footboard.
{ pick { heads, 6½-lb.	1	" limber,
{ helms, 3½-in.	1	" "
Bags { kit	2§	On top of box.
{ picketing gear	1	On platform board.
Bar, supporting pole, No. 2	1†	On platform board.
Blankets, G.S.	2	On top of box.
Boxes { fuze { No. 20	2	In compartments of limber box.
{ " 21	1	
{ " 28	1	
{ grease, 3-lb.	1	Rear of axletree, "off" side.
{ obturating pads	1	In compartment of limber box.
{ sight telescopic	1	On platform board, "near" side.
Brushes, water, carriage	1	On limber, "near" side.
Buckets, water, G.S., leather ..	2	Under limber.
Cans, lubricating, No. 3	1	Rear of axletree, "off" side.
Cases, can, lubricating, No. 3 ..	1	" " " "
Cartouches	2	In limber box.
Cartridges, 12 $\frac{7}{16}$ -oz., cordite, size 5 ..	44	" " " "
Clamps, tangent, sight {	2	1 in "off" " and 1 in "near" holdall, gun limber.
{ spare	1†	In "near" holdall, wagon limber.
Cloths, sponge	5	In each limber as convenient.
Couples, trace	2	In "off" holdall.
Discs, pad, { adjusting	1	In compartment, limber box.
{ obturating { protecting	sets 1	
Drivers, screw, G.S., 4-in.	1	In "off" holdall.
Fuzes, time and percussion, No. 56 ..	46	In fuze boxes.

§ Wagon limber only. † 1 per section.
 ‡ 11-inch to be retained until unserviceable.

List of Stores—*continued.*LIMBER, MARK I.—*continued.*

Description.	No.	Where carried.
Grease, Field's lb.	3	In grease box.
Hames (spare) pairs	1††	On platform board.
Handspike, traversing, No. 2, Mark II. spare	1†	On footboard of wagon limber.
Hooks, bill	1	Under limber, "off" side.
Keys { fuze, universal**	2	In pockets on box, rear of limber.
{ lock	2	In pocket rear of limber box.
Kettles, camp, oval 12 quarts ¶	1	Under limber "near" side.
Lanyards, friction, tube, T	2	In "near" holdall (wagon limber).
Lever, cam	1†	In compartment of box (wagon limber)
Magazines, portable	2	In rear of limber box.
Mullets	2	In bag on platform board.
Oil, Rangoon pint	1	In oil can.
Pads, obturating	1	In compartment, limber box.
Pegs, picketing	10	In bag on platform board.
Pins, linch, 2nd class spare	1	In "off" holdall.
Pin, pole, No. 17 pole	1†	In compartment "near" box, gun limber.
Rimers, vent, T	1	In "near" holdall.
Ropes { drag, light pairs	1	} On platform board.
{ heel	1	
{ picketing, 4 ft. 9 in.	6	} In bag on platform board.
Shells, Shrapnel	42	
Shot, case	2	In limber box.
Sights { fore {	2	In "off" holdall, gun limber.
	1††	In "off" holdall, wagon limber.
	2	1 in "off" and 1 in "near" holdalls, gun limber
	1††	In "near" holdall, wagon limber.
	1†	In telescopic sight box.
Spades, N.P.	2	One on each side of limber box.
Straps, securing, 44" x 1" (camp kettle lids) ¶	1	On lid of kettle.
Strap, kicking¶	1	On platform board, wagon limber.
Swingletrees, No. 10A spare	1	On platform boards.
Traces { saddlery pairs	2	} On footboard.
{ harness, short	1	
Tubes, T, friction	{ 59	} In limber box { wagon limber.
	{ 60	
Vents, T, axial	1	" " " " gun " "
Washers, drag, 2nd class, C	1	Under platform board, "near" side.
Wrench, breech mechanism A	1	In "near" holdall.

AMMUNITION WAGON, MARK I.

Bags, kit.	2	} On top of ammunition box.
Blankets, G.S.	2	
Bolts, stop	1§	In holdall, spare parts of gun.
Boxes { fuze, No. 20	3	In ammunition box.
{ grease, magazine, 14 lb.	2	Rear of axletree.
Caps, sponge, No. 4	1§	On sponge.
Cartouches	2	In ammunition box.
Cartridges, 12 7/16-oz. cordite, size 5	4S	" " " "
Cases, saw, hand	1	In front of ammunition box.

** When guns are parked, the fuze keys will be placed in holdalls in limbers.

† 1 per section.

‡ 1 on each carriage limber and one spare with "A" subdivision wagon limber.

§ 1 per battery.

¶ "A" subdivision.

¶ As required.

†† 1 per section, carried in "A," "C," and "E" subdivisions.

List of Stores—*continued.*AMMUNITION WAGON, MARK I.—*continued.*

Description.	No.	Where carried.
Collars, actuating	3	In holdall, spare parts of gun.
Fuzes, time and percussion, No. 56 ..	48	In fuze boxes.
Grease, Field's	lb. 28	In grease boxes.
Handspikes, common, 6-ft. ..	1	Under perch.
Holdalls { needles, and silk twist ..	1	In "off" holdall.
{ spare parts of gun.. ..	1	In compartment, ammunition box.
Jacks, lifting, G.S.	1	On platform board.
Kettles, camp, oval, 12-qts. ..	2	Under wagon.
{ fuze, universal**	2	In pockets in rear of box.
Keys { powder case	1	In "off" holdall.
{ lock	2	In pocket, rear of ammunition box.
Knives, clasp	1	In "near" holdall.
Lashings, tarred, 1-in., 10-ft. ..	2	On axletree.
Magazines, portable	2†	Securing spare polo.
Needles, magazine, phosphor bronze, 4-in.	2	In rear of wagon.
{ bolt elevating	1	In holdall, needles and silk twist.
{ hinge, bolt, carrier ring ..	2	
Pins, keep	2	In holdall, are parts of gun.
Polo, No. 18, jointed, spare ..	1†	
Saws, hand, 26-in.	1	In front of ammunition box.
Scissors, magazine	14	In "near" holdall.
Shell, shrapnel	16	In ammunition box.
Shot, case	2	" "
Shoes, drag, No. 7	1	On perch.
Silk twist	2	In holdall, needles and silk twist.
Spanner, No. 93.. ..	1	On "near" side of ammunition box.
Sponges, R.M.L., 13-pr., jointed ..	1†	Under perch.
{ catch, vent, T, axial	2	
{ clip, carrier ring	2	
Springs { stud, catch, left	2	In holdall, spare parts of gun.
{ " " right.. ..	2	
{ retaining, fore sight ..	4	
Straps, securing, 41-in. x 1-in... ..	2	Camp kettle lids.
Tubes, friction { T, drill	50	In compartment of ammunition box.
{ T, drill	1	In "near" holdall.
Washers, arm, axle- { 1/8-in. thick ..	1	
tree, 2nd class, C { 3/8-in. " ..	1	Under holdall in "off" box.

** When guns are parked, the fuze keys will be placed in holdalls in limbers.

† Per section.

‡ 1 per battery.

List of Stores—*continued.*

CARRIAGE, MARK II.

Description.	No.	Where carried.
Bit, vent, 14-inch	1	On top of trail.
Box, cartridge	2	Component of axletree box.
Brushes, breech screw	1	In pocket brake arm, right side.
Buckets, water, G.S., leather	2	Under carriage.
Can, lubricating, No. 9.. ..	1	In leather case, on right side.
Caps, sponge, No. 6	2	On cleaners.
Cap, leather, rear spring case	1	On rear spring case.
Cartridges, cordite, 12 ¹ / ₂ ozs., size 5	4	Two in each axletree box.
Case, can lubricating, No. 9b	1	On right side.
Cleaners, { pinaba	1	On brake arm, right side.
{ wool	1	On stensilo stay, left „
Covers, { bracket telescopic sight	1	On telescopic sight bracket.
{ breech	1	On gun.
Cutter, wire	1	In pocket on brake arm, right side.
Hammer, claw, 20-oz.	1	On left side.
Handspike, traversing, No. 2, Mark III	1	On top of trail, right side.
Keys, fuze, universal	1	In pocket, key fuze universal.
Lanyards, friction tube T	2	1 in pocket on left brake arm and 1 in right axletree box.
Oil, Rangoon pints	1 ¹ / ₂	In No. 9 lubricating can.
Pincers, carpenters' pairs	1	On left side.
Pockets, { breech bush	1	On right brake arm.
{ key fuze, universal	1	„ left „ „
{ lanyard	1	„ „ „ „
Posts, aiming	2 ^a	„ „ side. „
Rammer	1	„ top of trail, left side.
Rimer, vent T	1	In back of pocket, key fuze universal.
Rod, vent, 14-inch	1	On top of trail.
Shell, shrapnel, B.L., 12-pr.	2	In left axletree box.
Shot, case	2	„ right „ „
Spanner, McMahon, 15-inch	1	On right side.
Tampeon.. ..	1	On axletree, right side.

^a 2 red discs in "A," "C," and "E" subdivisions.

2 blue „ „ "B," "D," „ "F" „

LIMBERS, MARK II.

(CARRIAGE AND AMMUNITION WAGON.)

Description.					Carriage Limber.	Wagon Limber.	Where carried.
Axes, felling, curved helve	..	..	..	..	1	1	Under footboard.
Axes, pick { heads, 6½-lb.	..	..	..	..	1	1	„ limber.
{ helves, 34½-ins.	..	..	..	..	1	1	„
Bags, { kit	..	..	..	..	—	2	On top of box.
{ picketing gear	..	..	..	..	1	1	On platform board.
Bars, supporting draught pole, No. 2 (spare)	..	..	..	..	1 ^a	—	„
Blankets, G.S.	..	..	..	..	2	2	On top of box.
fuze, No. 31	..	..	..	..	3 ^b	3 ^b	In ammunition box.
grease, 3-lb.	..	..	..	..	1 ^b	1 ^b	Rear of axle-tree.
obturator, steep coned, B.L., 12 or	..	..	..	..	1	1	In lower tray of ammunition box.
Boxes, { 15-pr.	..	..	..	..	1	1	On platform board, near side.
telescopic sight	..	..	..	..	1	1	„
T tubes	..	..	..	..	1 ^b	1 ^b	In ammunition box.
cartridge	..	..	..	..	9	9	„
Brushes, water carriage	..	..	..	..	1	1	Under footboard, near side.
Buckets, water, G.S.	..	..	..	..	2	2	Under limber.
Can, lubricating, No. 3	..	..	..	..	1 ^b	1 ^b	In case can lubricating No. 3.
Cartridges, cordite, 12½-ozs., size 5	..	..	..	..	36	36	In 9 tin cartridge boxes.
Cases, can, lubricating, No. 3	..	..	..	..	1 ^b	1 ^b	Rear of axle-tree.
Carriers, { case shot	..	..	..	..	1	1	In ammunition box.
{ shrapnel shell	..	..	..	..	8	8	„
Cloaks	..	..	..	..	2	2	„
Cloths, sponge	..	..	..	..	5	5	In lower tray of ammunition box.
Couples, trace	..	..	..	..	2	2	In upper tray of ammunition box.
Discs, adjusting, obturator	..	..	..	(spare)	1	1	In box obturator, steep coned.
Driver, screw, G.S., 4-inch	..	..	..	..	1	1	In upper tray.
Fuzes, T and P, No. 56	..	..	..	..	36	36	In 3 tin fuze boxes.
Grease, Field's	..	..	..	..	lb. 3	3	In grease box.
Hames (spare)	..	..	..	..	pairs 1 ^c	—	On platform board.
Hooks, bill	..	..	..	..	1	1	Under off side.
Kettles, camp, oval, 12 qts.	..	..	..	..	1 ^d	1 ^d	Front of axle-tree.
Keys, fuze, universal	..	..	..	..	2 ^c	2 ^c	One in each pocket, rear of limber.
Lanyards, friction tube T	..	..	..	..	—	2	In upper tray, ammunition box.
Mallets	..	..	..	..	2	2	In bag, on platform board.
Obturator; pad with front and rear protecting discs	..	..	..	(spare)	1	1	In box obturator, steep coned.
Oil, Rangoon	..	..	..	..	pints 1	1	In No. 3 lubricating can.
Pegs, picketing	..	..	..	..	10	10	In bag on platform board.
Pins, keep, split,	{ 2-inches x 192-inches (spare)			..	6	—	In tin box, upper tray of ammunition box.
	{ 7 „ x .08 „ („)			..	6	—	
	{ 35 „ x .06 „ („)			..	6	—	
	{ elevating bolt.. („)			..	6	—	

^a "B," "D," and "F" subdivisions.^b Issued with limber.^c "A," "C," and "E" subdivisions.^d As required.^e When the guns are parked, the fuze keys should be carried in the upper tray, on all other occasions they should be carried in the pockets.

LIMBERS, MARK II.—continued.

(CARRIAGE AND AMMUNITION WAGON.)

Description.				Carriage Limber.	Wagon Limber.	Where carried.
Pins, linch, 2nd Class	(spare)	1	1	1	1	In lower tray of ammunition box.
Pins, pole No. 17-18 pole with key and chain	(")	1 ^f	—	1 ^f	—	In lower tray of ammunition box.
Rimers, vent, T	(")	1	1	1	1	In upper tray, ammunition box.
Ropes, {	drag, light	pairs	1	1	1	On platform board.
	heel .. ..	..	1	1	1	In bag, on platform board.
	picketing, 4'-9" .. ..	..	6	6	6	In bag, on platform board.
Shell, shrapnel .. ..	..	32	32	32	32	In ammunition box.
Shot, case .. ..	..	2	2	2	2	In upper " " tray of ammunition box when not on gun.
Sights, B.L., {	Fore	1	1 ^f	1	1 ^f	
	Tangent	1	1 ^f	1	1 ^f	
Spades, N.P.	Telescopic	1	1 ^f	1	1 ^f	In box, on platform board.
	.. ..	2	2	2	2	One on each side of limber.
Springs, {	Catch retaining breech mechanism lever (spare)	3	—	3	—	In upper tray of ammunition box.
	Catch retaining breech screw (")	3	—	3	—	
	Extractor	3	—	3	—	
	Guide bolt	3	—	3	—	
	Vent, axial	3	—	3	—	
Straps, kicking .. ..	..	—	1 ^b	—	1 ^b	On platform board.
Swingletree, No. 10A	(spare)	1	1	1	1	" " " " "
Swords, cavalry .. ..	..	2	2	2	2	Front of limber box.
Traces, {	harness, short	(spare)	1	1	1	On platform board.
	saddlery (spare)	pairs	2	2	2	" " " " "
Tubes, friction T .. ..	..	50	50	50	50	In T tube box.
Vent, T, axial .. ..	..	1	1	1	1	In lower tray of ammunition box.
Washers, drag, 2nd Class C	(spare)	1	1	1	1	Under platform board, near side.
Wrench breech mechanism, {	A	1	—	1	—	In upper tray of ammunition box.
	B	1	—	1	—	
	C	1	—	1	—	

^f 1 per section, in "A," "C," and "E" subdivisions.^b 1 per battery spare, in "A" subdivision.^a "A" subdivision.

AMMUNITION WAGON, MARK II.

Description.	No.	Where carried.
Blankets, G.S.	2	On top of box.
Block, retaining tube	1 ^a	In tray small stores, ammunition box.
Boxes, { cartridge	16	} In ammunition box.
{ fuze, No. 31	5 ^b	
{ grease, 14-lb.	2 ^b	Under wagon, rear of axletree.
{ slide	1 ^a	In tray small stores, ammunition box.
{ T tubes	2 ^b	In ammunition box.
Cap, sponge, No. 4	1	On sponge.
Carriers, { case shot	1	} In ammunition box.
{ shrapnel shell	15	
Cartridges, cordite, 12 $\frac{7}{16}$ -ozs., size 5 ..	64	In 16 cartridge boxes.
Cases, saw, hand	1	On off side of wagon.
Extractor, box slide	1	In tray small stores, ammunition box.
Fuzes, T and P, No. 56	60	In 5 tin fuze boxes.
Grease, Field's	lb. 28	In boxes under wagons.
Handspike, { common	1	Under wagon.
{ traversing, No. 2, Mark III	1 ^a	Front of wagon on box.
Holdalls, needles and silk twist	1	In tray small stores, ammunition box.
Jacks, lifting, G.S.	1	On platform board.
Kettle, camp, oval, 12 qts.	2 ^c	Under wagon front of axletree.
Keys, { fuze, universal	2 ^d	One in each pocket, rear of wagon.
{ powder case	1	} In tray small stores, ammunition box.
Knives, clasp	1	
Lashings, tarred, 1 in. x 10 ft. ..	2	On axletree.
Line, Hambro	1	} In centre compartment, front ammunition box.
Marline	1	
Needles, magazine, P.B., 4 inch ..	2	In holdall, tray small stores ammunition box.
Pinion, link	1 ^e	In tray small stores, ammunition box.
Pole, jointed, No. 18	1 ^f	Under wagon.
Saws, hand, 26-inch	1	In case off side of wagon.
Scissors, magazine	1	In tray small stores, ammunition box.
Shell, shrapnel	60	} In ammunition box.
Shot, case	2	
Silk twist	ozs. 2	In holdall, tray small stores, ammunition box.
Spanner, No. 93.	1	On near side of wagon.
Sponge, jointed, R.M.L., 13-pr. ..	1 ^g	Under wagon.
Tubes, { T	70	} In 2 T tube boxes.
{ friction, T drill	1	
Washers, { arm axletree, } $\frac{1}{16}$ " thick	1	} In tray small stores, ammunition box.
{ 2nd Class, C } $\frac{3}{32}$ " "	1	

^a "A," "C," and "E" subdivisions.

^b Issued with the wagon.

^c As required.

^d When the guns are parked, the fuze keys should be carried in the tray for small stores, on all other occa-

sions they should be carried in the pockets.

^e "A" subdivision.

^f Under wagons of "A," "C," "E," and "F" subdivisions.

^g Under the perch of "B" subdivision.

LIST OF STRAPPING.

CARRIAGE, MARK I*.

Size in Inches.	Service for which Straps are required.	No.	Position of Straps.
$\frac{3}{4}$ x 10	Posts, aiming	1	On right side.
$\frac{3}{4}$ x 24 B.P., C.B.	Blankets	4	On axletree boxes.
$\frac{3}{4}$ x 26	Cleaners	2	On left tensile stay.
1 x 13	Hammer, claw	1	On left side.
1 x 13	Pincers	1	On right side.
1 x 13	Spanners, McMahon	1	
1 x 18	Tampeon,	1	On "axletree", right side.
D.L.	Wheel, hand	1	On carriage, close to hand wheel.

LIMBER, MARK I.

Size in Inches.	Service for which Straps are required.	No.	Position of Straps.
1 x 10 { double with loop	Axe, pick	1	Under limber.
$\frac{3}{4}$ x 6	Box, telescopic sight	1	Front of limber, on box.
$\frac{3}{4}$ x 13	Spades "	1	" " " " " "
$\frac{3}{4}$ x 13	Spades "	2	One on each side. "
1 x 10	Kettle, camp (handle)	1	Under limber.
1 x 13	Axe, felling	1	" footboard.
1 x 13	" pick	1	" limber.
1 x 13	Brush, water	1	On futchel, near side.
1 x 13	Hook, bill	1	" " " off "
1 x 13	Washer, drag	1	On platform board.
1 x 18	Axe, felling	1	Under footboard.
1 x 18	" pick	1	" limber.
1 x 22	Spades (handles)	2	One on each side.
1 x 26	Bags, kit	4	On top of boxes.
1 x 26	Box, grease, 3 lb.	1	Under limber at rear.
1 x 26	Case, oil can	1	
1 x 26	Swords	2	Front of limber, on boxes.
1 x 30	Ropes, drag, pole bar and swingletree, &c.	2	On platform board.
B.P., C.B.	Blankets	4	" top of boxes.
1 x 44	Kettle, camp (lid)	1	Under limber.
1 x 44	Magazines, portable	2	Rear of limber, on box.
1 x 44	Picketing gear in bag	2	On platform board.
1 x 54	Box, telescopic sight	1	Front of limber.

LIST OF STRAPPING—*continued.*

AMMUNITION WAGON, MARK I.

Size in Inches.	Service for which Straps are required.	No.	Position of Straps.
1 x 10	Kettles, camp (handle)	2	Under wagon.
1 x 13	Spanner, No. 93	1	On box, "near" side.
1 x 26	Bags, kit	4	On top of wagon.
1 x 26	Spongo, jointed	1	Under wagon.
1 x 26	Swords	2	Front of wagon, on box.
1 x 30	Jack, lifting, G.S.	2	On footboard.
1 x 32	Blankets	4	On top of boxes.
B.P., C.B.			
1 x 44	Handspike, common	1	Under wagon.
1 x 44	Kettles, camp (lid)	2	"
1 x 44	Magazines, portable	2	On rear of ammunition box.

CARRIAGE, MARK II.

Size in Inches.	Service for which Straps are required.	No.	Position of Straps.
$\frac{3}{4}$ x 9	Case, No. 9 oil can	1	On right side.
$\frac{3}{4}$ x 10	Posts, aiming	1	"
$\frac{3}{4}$ x 30	Cleaners	2	One on each tensile stay.
Double			
1 x 13	Hammer, claw	1	On left side (near trunnion).
1 x 13	Pincers	1	"
1 x 13	Spanner, McMahon	1	" right side.
1 x 18	Tampon	1	" axle tree, right side.
1 x 22	Wheel, hand	1	" left tensile stay, close to handwheel.
D.L.			

LIST OF STRAPPING—*continued.*

LIMBER, MARK II.

Size in Inches.	Service for which Straps are required.	No.	Position of Straps.
$\frac{3}{4}$ x 9	Box, telescopic sight	1	Front of limber, on box.
$\frac{3}{4}$ x 13	" " " "	1	" " " " " "
$\frac{3}{4}$ x 13	Spades	2	One on each side.
1 x 10	Brush, water	1	Under footboard "near" side.
1 x 10	Hook, bill	1	Under footboard "off side.
1 x 10	Kettle, camp (handle)	1	Under limber.
1 x 13	Axe, felling	1	" footboard.
1 x 13	" pick	1	" limber.
1 x 13	Washer, drag	1	" platform board.
1 x 22	Spades (handles)	2	One on each side.
1 x 22	Swords	2	Front of limber, on box.
1 x 26	Bags, kit	4	On top of box.
1 x 26	Box, grease, 3 lb.	1	Under limber, at rear.
1 x 26	Case, oil can	1	" " "
1 x 30	Ropes, drag, pole bar, swin- gletrees, &c.	2	On platform board.
1 x 30 with loop	Blankets	4	" top of box.
1 x 44	Kettle, camp (lid)	1	Under limber.
1 x 44	Picketing gear, in bag	2	On platform board.
1 x 54	Box, telescopic sight	1	Front of limber.

WAGON (AMMUNITION), MARK II.

Size in Inches.	Service for which Straps are required.	No.	Position of Straps.
1 x 10	Kettles, camp (handle)	2	Under wagon.
1 x 13	Handspike, traversing	1	Front of wagon, on box.
1 x 13	Spanner, No. 93	1	On box, "near" side.
1 x 18	Handspike, traversing	1	Front of wagon, on box.
1 x 22	" common	1	Under wagon, at front.
1 x 22	Sponge, jointed	2	" " (1 at front and 1 at rear).
1 x 22	Swords	2	Front of wagon, on box.
1 x 26	Bags, kit	4	On top of wagon.
1 x 30	Jack, lifting, G.S.	2	" footboard.
1 x 36	Handspike, common	1	Under wagon, at rear.
1 x 44	Kettles camp (lid)	2	" " "
1 x 44 with loose loop	Blankets	6	On top of wagon.

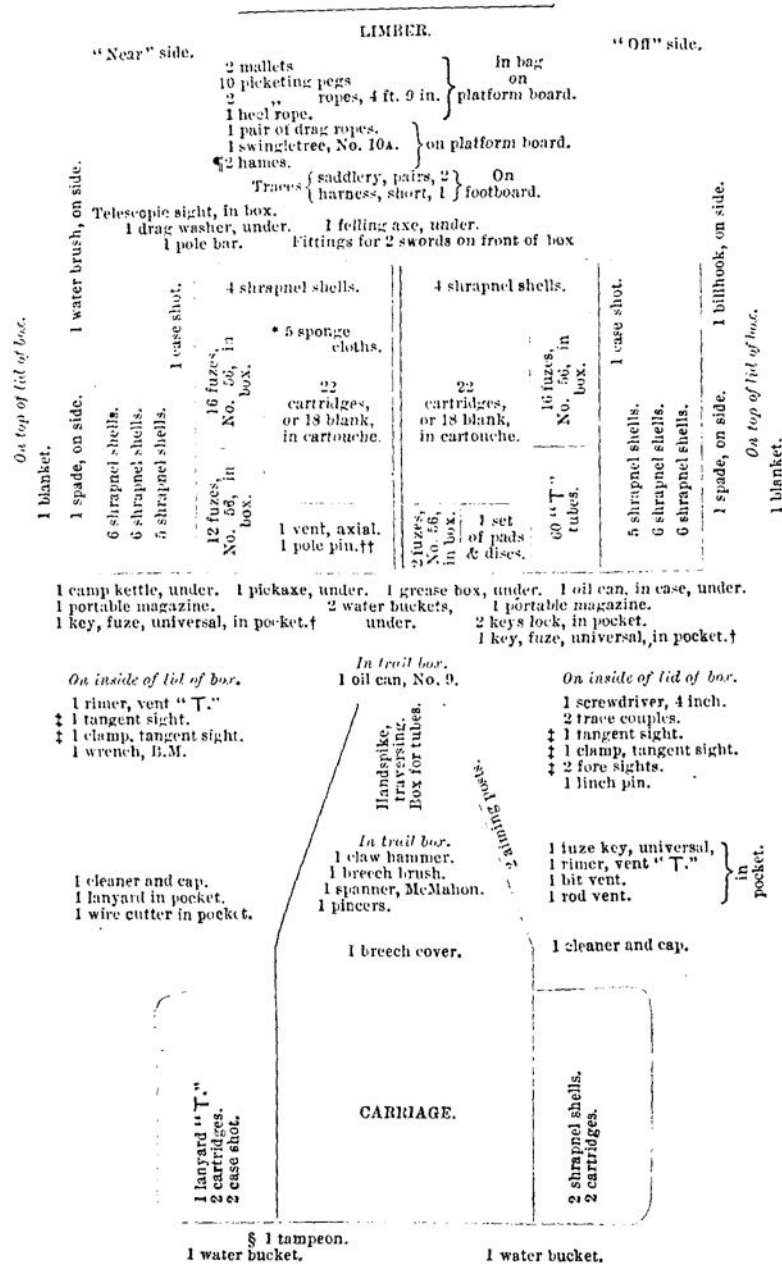
(7106)

Б 2

A

DIAGRAM OF PACKING.

12-PR. B.L. 6-CWT., MARK I*, EQUIPMENT, CARRIAGE AND LIMBER.



* Carried as convenient.

† When the guns are parked, the fuze keys will be placed in holdall, in limber.

‡ When not in gun.

§ Strapped to axletree, when not in gun.

†† 1 per section.

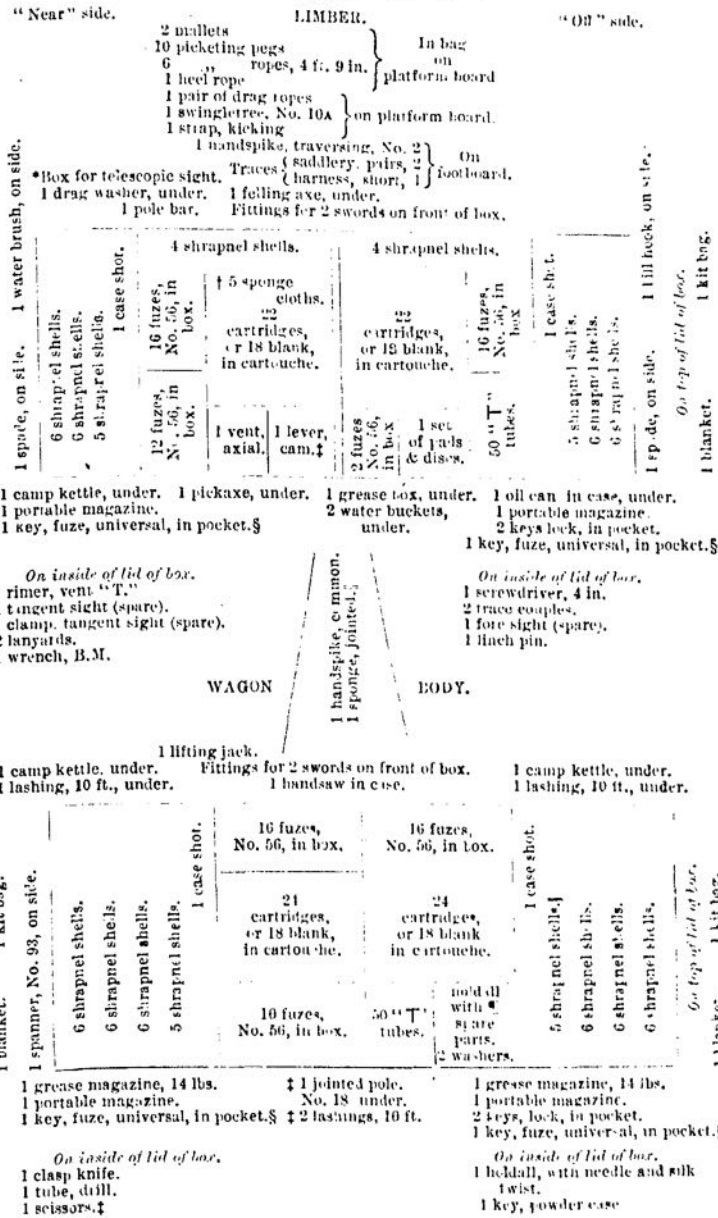
‡‡ Per section, carried in "A," "C," and "E" subdivisions.

DIAGRAM OF PACKING.

12-PR. B.L. 6-CWT., MARK I*, EQUIPMENT, WAGON AND LIMBER.

A

PUBLIC LIBRARY OF VICTORIA



* 1 spare sight per battery, with "A" subdivision.

† Carried as convenient.

‡ Per section, carried in "A," "C," and "E" subdivisions.

When the guns are parked, the fuze keys will be placed in holdall, in limber.

1 per battery, "A" subdivision.

1 bolt, stop, 3 collars, actuating, 2 pins, keep, carrier ring.

2 pins, keep, bolt elevating, 2 springs, catch, vent, axial, 2 springs, clip, carrier ring.

2 springs, stud, catch, left, 2 springs, stud, catch, right.

4 springs, retaining fore sight.

B

DIAGRAM OF PACKING.

B.L., 12-PR., 6-CWT., MARK II EQUIPMENT, CARRIAGE AND LIMBER.

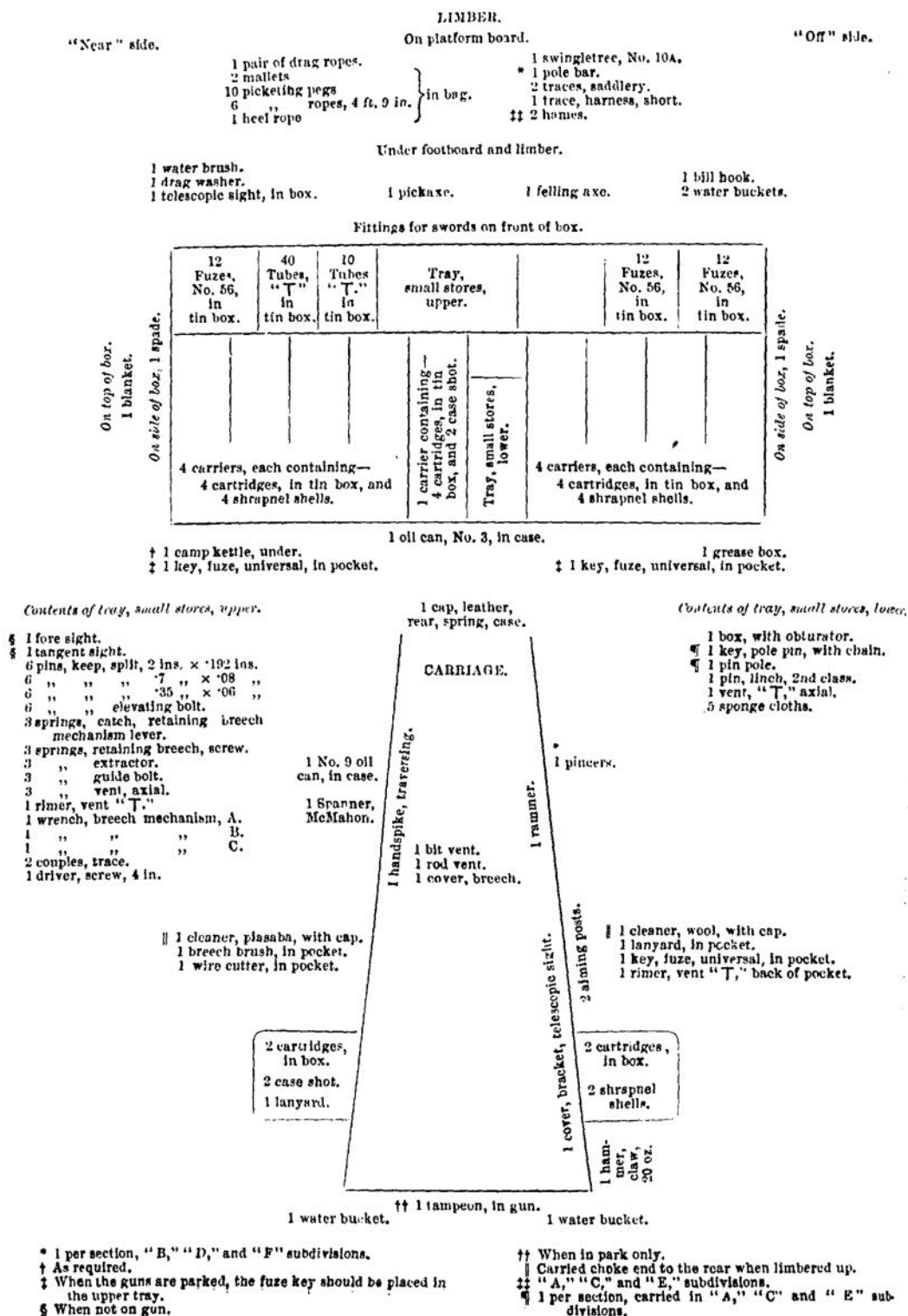
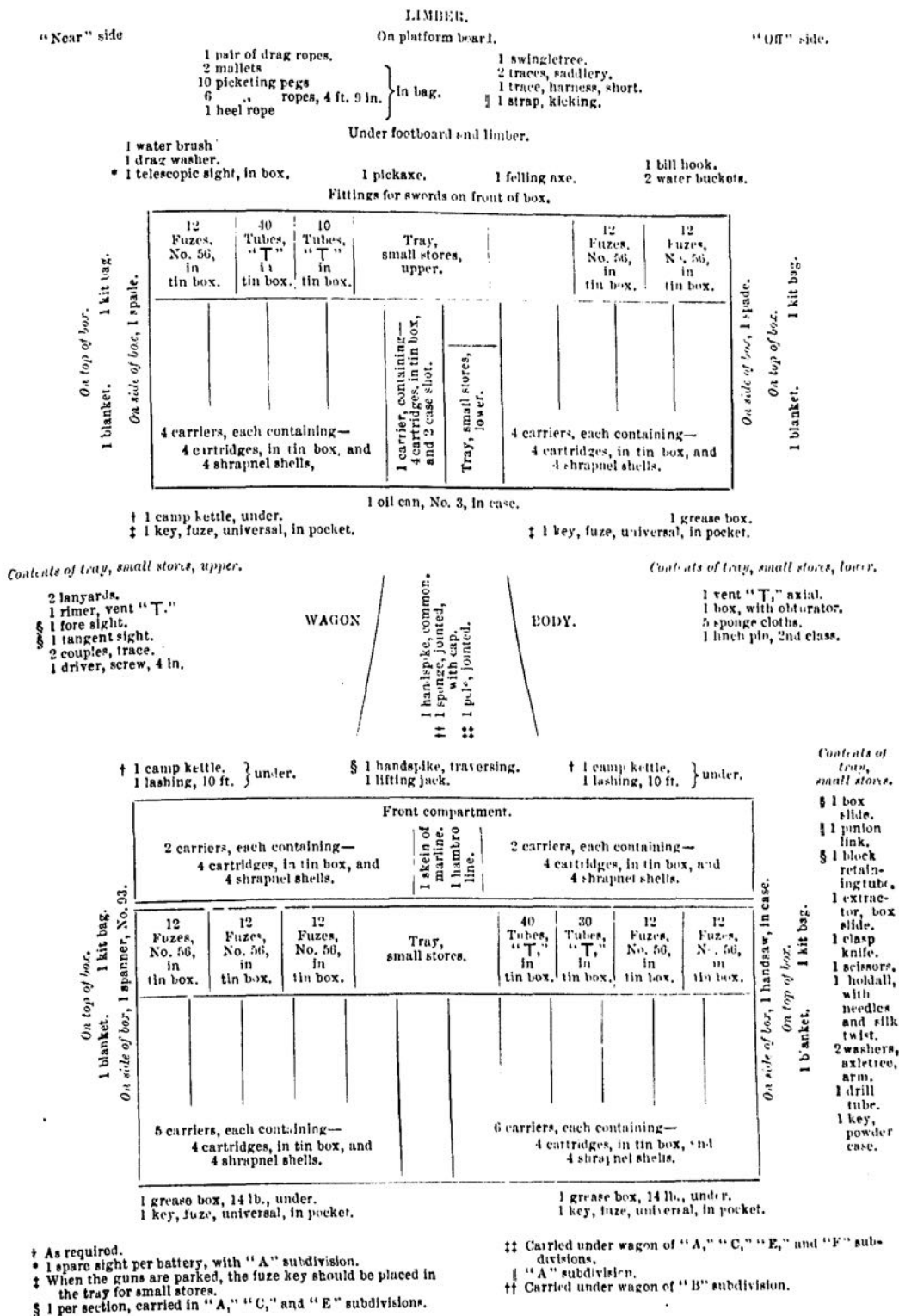


DIAGRAM OF PACKING.

B.L., 12-PR., 6-CWT., MARK II EQUIPMENT, WAGON AND LIMBER.

B

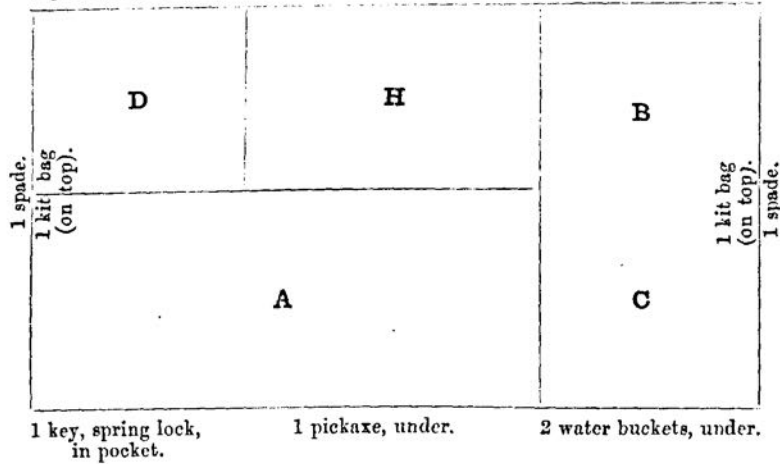


C

WAGONS, FORGE, R.A., MARKS I* AND II.
(PACKED FOR 12-PR. 6 CWT., MARK I* AND II., B.L.
EQUIPMENTS.)

LIMBER.

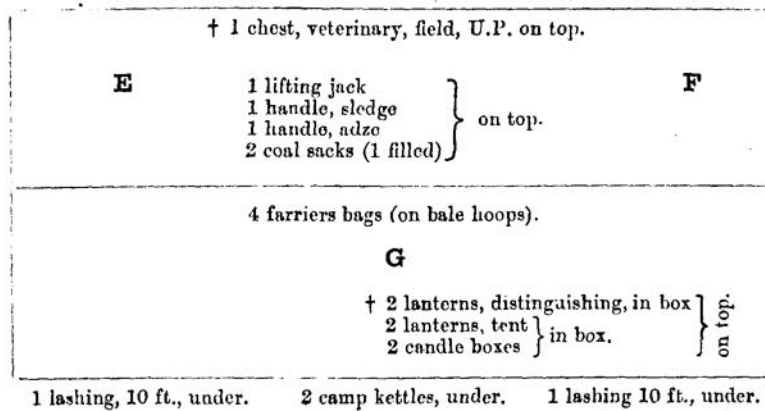
2 mallets
10 picketing pegs
6 picketing ropes, 4 ft. 9 in. } in bag on footboard.
1 heel rope
1 pair drag ropes } on footboard.
1 swingletree }
1 water brush } under. 1 felling axe, under. 1 bill hook, under.
1 grease box }



WAGON.

Anvil.

Anvil block.



C

COMPARTMENT "A" (Bottom of Limber Box).

Dubbing	Oil, Rangoon
Glue	Wax, black
Oil, olive	

COMPARTMENT "B" (Bottom of Limber Box).

Dubbing

TRAY "C."

Vice, bench Cards, towing

TRAY "D."

Couples, trace	Pins, linch
Chain, brass	Springs, { pawl, supporting spade ..
Keys, { capsquare	{ spiral, brake block ..
{ guard iron	{ round, crowned ..
{ lock	{ lashing, 1 $\frac{1}{2}$ -in... ..
{ pole pin	{ with plate
Locks, { ammunition box	Turnbuckles
{ pad	Washer, drag

TRAY A.

Bolts, elevating

COMPARTMENT "H."

† Handle, lever, forge	Shackles, wire rope
Lever, supporting brake block	Springs, spiral, recoil
Nuts, actuating	
Pins, { axis rocking lever	
{ coupling	
{ locking	

COMPARTMENT "E" (Wagon).

Set of smiths' tools; set of tinmen's tools; forge and shoeing tools (farriers'); with borax, resin, solder, sal-ammoniac, spelter, sawyers' wedges, sponge cloths, and handbooks "Military Artificer's."

COMPARTMENT "F" (Wagon).

Set of wheelers' tools; with bolts, nails, keys loop, rivets, screws, and tacks (also 8 basil aprons on top of tool chest).

COMPARTMENT "G" (Wagon).

† Forge (with poker and slice) .. 1	Hammers, sledge, { farriers' .. 2
Grindstone, 10-in. 1	{ smiths' .. 1
	Tongs, farriers', fire

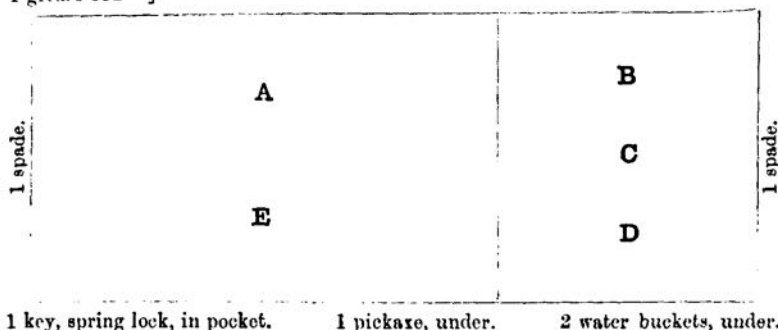
† The Mark 1* wagon carries the Mark II G.S. field forge; the Mark II wagon carries either the Mark II G.S. field forge, or the Mark IV R.A. field forge.
‡ When Mark IV forge is carried only.

D

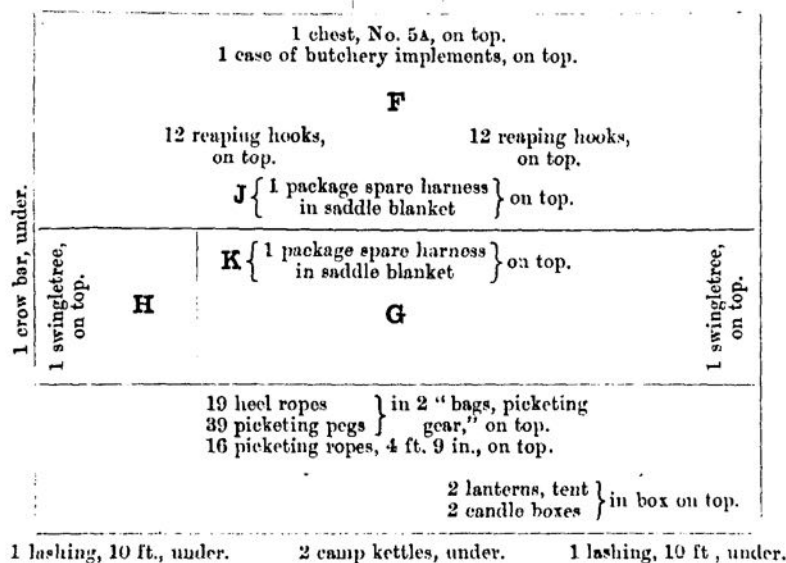
WAGON, STORE, R.A., MARK I.
(PACKED FOR 12-PR. B.L. 6 cwr. MARKS I* AND II EQUIPMENTS.)

LIMBER.

2 mallets 8 picketing pegs 4 picketing ropes, 4 ft. 9 in. 1 heel rope 1 pair drag ropes 1 swingletree	} in bag on footboard. } on footboard.	1 water brush 1 grease box	} under.	1 felling axe, under.	1 bill hook, under.
--	---	-------------------------------	----------	-----------------------	---------------------



WAGON.



COMPARTMENT "A" (Bottom of Limber Box).

Soap, yellow,

COMPARTMENT "B" (Bottom of Limber Box).

Oil, rangoon,

LOWER TRAY "C" (In two boxes).

Buckles.

Rivets.

Staples.

Tallow

Needles.

Squares.

Tucks.

UPPER TRAY "D."

Couples, trace ..

Pin, linch

Handcuffs, pairs ..

Locks, pad ..

Stone, rub.

Washer, drag

COMPARTMENT "E."

Soap, yellow ..

Tow, coarse ..

Bandages, &c., for Sick Horses.

COMPARTMENT "F" (WAGON).

Arches { harness ..

Felloes { No. 35A ..

Serge, collarmakers ..

saddlery ..

Felt, brown

† Steels { limber hook ..

Bars { harness ..

Glue

Straps, various ..

saddlery ..

Hair, horse

Thread { flat ..

Basils, unstrained ..

Hammer, sledge ..

whitened brown ..

Bits, bridoon, hooks ..

Hooks, draught ..

Traces { attachments ..

Blankets, old ..

Hides, various ..

hooks ..

Canvas, sail ..

Keys, limber hook ..

Twine, quilting ..

Cloth, strappings ..

Linen, old ..

Worsted, grey ..

Cordage, hawser ..

Links, curved ..

Cord { cotton ..

Pipes, trace, strips ..

COMPARTMENT "G" (WAGON).

Bracket, sight, telescopic

† Carrier

† Ring, carrier

† Lever breech mechanism

Screw, breech

} in tray.

Blocks, brake

† Blocks, wood

† Bolts, connecting

Clams, collarmakers

Cylinders, paint, with mineral

jelly

† Iron, 2 ft. 8 in., bolt ..

† Iron, 2 ft. 8 in., flat ..

Ropes, wire recoil case ..

Spokes { No. 35A

" 36

" 42

† Steel pieces { bolt

flat

plate

Steel, tire

Wheel, hand

Wire, copper

COMPARTMENT "H" (WAGON).

Capsquares

† Iron plate, 1 ft. 6 in. ..

COMPARTMENT "I" (WAGON).

Stationery.

CONTENTS OF PACKAGE "J."

Bags, nose 4

Bits, portmouth, { Mark II .. 5

reversible { heads, bridle .. 2

Chains, hame 3

Leggings, drivers' 2

Links, double 4

Pannels, numnah 5

Traces, harness, wheel .. 1

Whips, drivers' 6

Bits { bridoon 4

portmouth { chains, curb 6

hooks, curb 12

Irons, stirrup, G.S. .. 18

Leathers, stirrup 18

CONTENTS OF PACKAGE "K."

Bags, nose 4

Breechings 1

Collars, head, R.A. .. 3

Girths, leather 4

Hooks, pole bar 6

Pannels, numnah 6

Pieces, buckling, 1½-inch .. 2

Reins { bearing 4

side 2

Runners, stirrup leather .. 18

{ breast, breechings .. 2

flank 4

hame 2

Straps { wither, 1½-inch .. 2

pole bar 6

cloak and wallet .. 2

centre 2

shoe, case 1

Surcingle, leather harness .. 2

NOTE.—Each package wrapped in saddle blanket and secured by a stirrup leather,

† Mark II equipment.

† Mark I* equipment.

E

WAGON, STORE, R.A., MARK II.
(PACKED FOR 12-PR. 6 CWT. R.L. MARKS I* AND II.,
EQUIPMENTS).

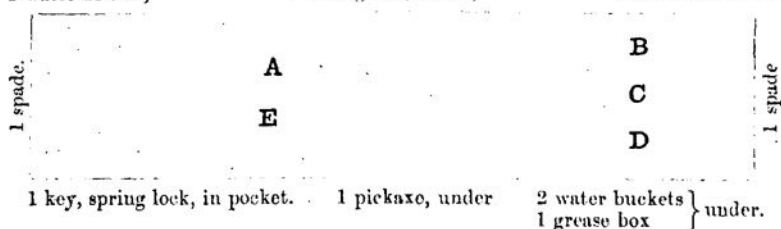
LIMBER.

4 picketing ropes, 4 ft. 9 in. }
8 " pegs } in bag on footboard.
2 mallets }
1 heel rope }
1 pair drag ropes } on footboard.
1 swingletree }

1 drag washer }
1 water brush } under.

1 felling axe, under,

1 bill hook under.

**WAGON.**

1 camp kettle, under.

1 crow bar }
1 camp kettle } under.

1 chest No. 5A.
1 case, butchery implements } on top.

I.12 reaping hooks,
on top.12 reaping hooks,
on top.**II.**

F

{ 1 package spare harness
in saddle blanket } on top.

G

{ 1 package spare harness
in saddle blanket } on top.

III.

39 picketing pegs } in 2 "bags, picketing
19 heel ropes } gear," on top.
19 picketing ropes, 4 ft. 9 in., on top.

IV.

2 lanterns, tent }
2 candle boxes } in box, on top.

1 lashing, 10 ft., under.

1 lashing, 10 ft., under.

COMPARTMENT "A" (Bottom of Limber Box).

Soap, yellow.

COMPARTMENT "B" (Bottom of Limber Box)

Oil, Rangoon.

LOWER TRAY "C."

(In two boxes.)

Buckles.	Rivets.	Staples.	Tallow.
Needles.	Squares.	Tacks.	
UPPER TRAY "D."			
Couples, trace..	Pin, linch ..	Handcuffs ..	..
Locks, pad ..	Stone, rub ..	Washer, drag ..	..

COMPARTMENT "E."

Soap, yellow.	Tow, coarse.	Bandages, &c., for sick horses.
---------------	--------------	---------------------------------

BOX I (WAGON).

Arches { harness ..	Felloes, No. 35A ..	Shoes, brake ..	..
saddlery ..	Felloes, No. 36 or 42 ..		
Bars { harness ..	Felt, brown..		
saddlery ..	Hammer, sledge ..	+Steels { limber hook..	..
Canvas, sail ..	Hair, horse ..	trail eye ..	..
Cloth, strappings ..	Hooks, draught ..	Straps, various ..	..
Cordage, hawser ..	Keys, limber hook ..		

BOX II (WAGON).

Bits, bridoon hooks ..	Hides, various ..	Thread { flax ..	..
Basils, unstrained ..	Linen, old ..	whited brown	..
Blankets, old ..	Links, curved ..	Traces { attachments ..	..
Clams, collarmakers' ..	Pipes, trace, strips ..	hooks ..	..
Cord { cotton ..	Serge, collarmakers' ..	Twine, quilting ..	..
whip ..		Worsted, grey..	..

BOX III (WAGON).

Bracket, sight, telescopic ..	..	
+Carrier ..	..	
+Lever, breech mechanism ..	..	
+Ring, carrier ..	..	
Screw, breech ..	..	
Blocks, brake ..	+Iron, 2 ft. 8 in. { bolt ..	Steel, pieces, tire ..	..
+Blocks, wood ..	flat ..	Spokes { No. 35A ..	..
+Bolts, connecting ..	Ropes, wire recoil case ..	Nos. 36 or 42 ..	..
Capsquares ..		Wheel, hand ..	..
Cylinders, paint with ..	+Steel, pieces { bolt ..	Wire, copper ..	..
mineral jelly ..	flat ..		
+Iron { tire ..	plate..		
plate, 1 ft. 6 in.			

BOX IV (WAGON).

Stationery.

CONTENTS OF PACKAGE "F."				CONTENTS OF PACKAGE "G"			
Bags, nose ..	..	..	4	Bags, nose ..	..	..	4
Bits, portmouth, { Mark II ..	5	Breechings ..	..	..	..	..	1
reversible { heads, bridle ..	2	Collars, head, R.A. ..	..	..	..	..	3
Chains, hame ..	..	Girths, leather ..	..	..	..	..	4
Leggings, drivers' ..	..	Hooks, pole bar ..	..	..	..	..	6
Links, double ..	..	Pannels, numnah ..	..	..	..	..	6
Pannels, numnah ..	..	Pieces, buckling, 1½ in. ..	..	..	..	..	2
Traces, harness, wheel ..	..	Reins { bearing ..	..	..	..	..	4
Whips, drivers' ..	..	side ..	..	..	..	..	2
Bits { bridoon ..	..	Runners, stirrup leather ..	..	..	..	..	18
portmouth { chains, curb..	6	breast breeching..	..	..	..	..	2
hooks, " ..	12	flank ..	..	..	..	..	4
Irons, stirrup, G.S. ..	..	hame ..	..	..	..	..	3
Leathers, stirrup ..	..	withers, 1½ in. ..	..	..	..	..	2
	18	pole bar ..	..	..	..	..	6
		cloak and wallet..	..	..	..	..	2
		centre ..	..	..	..	..	2
		shoe cas o ..	..	..	..	..	1
		Surcingles, leather harness ..	..	..	..	..	2

NOTE:—Each package wrapped in saddle blanket and secured by a stirrup leather.

† Mark I* equipment.

‡ Mark II equipment.

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Printers in Ordinary to Her Late Majesty.

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ALTERATIONS.

Para. of L. of C.	Nature of Change.	Remarks.

Para. of L. of C.	Nature of Change.	Remarks.

(7106)

Para. of L. of C.	Nature of Change.	Remarks.

Para. of L. of C.	Nature of Change.	Remarks.

Para. of L. of C.	Nature of Change.	Remarks.

Para. of L. of C.	Nature of Change.	Remarks.

Para. of L. of C.	Nature of Change.	Remarks.

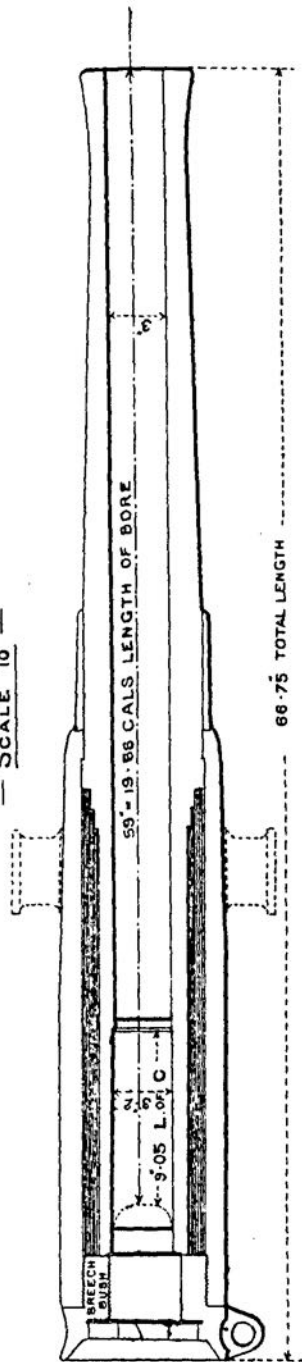
Para. of L. of C.	Nature of Change.	Remarks.

Para. of L. of C.	Nature of Change.	Remarks.

ORDNANCE, B.L., 12 PR 6CWT.

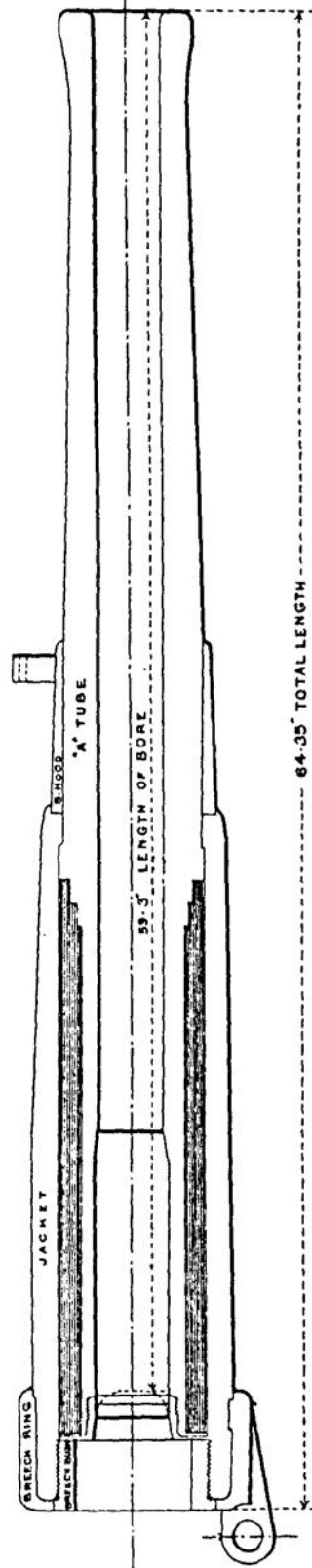
— MARK I. —

— SCALE $\frac{1}{10}$ —



— MARK II —

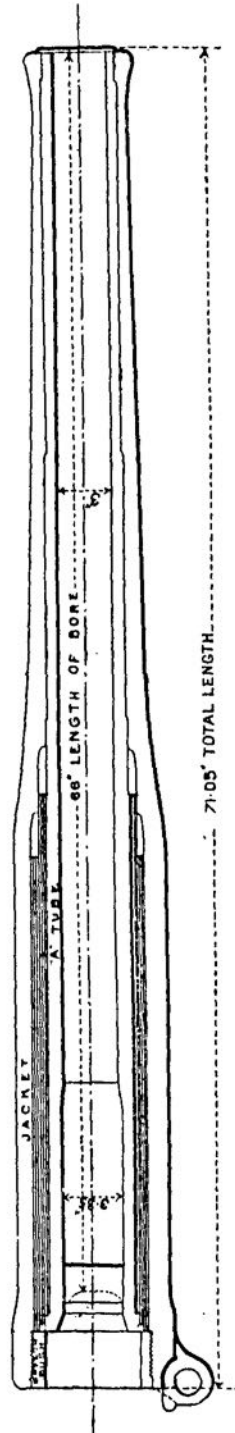
— SCALE $\frac{1}{8}$ —



ORDNANCE, B.L. 12 PR. 6.CWT.

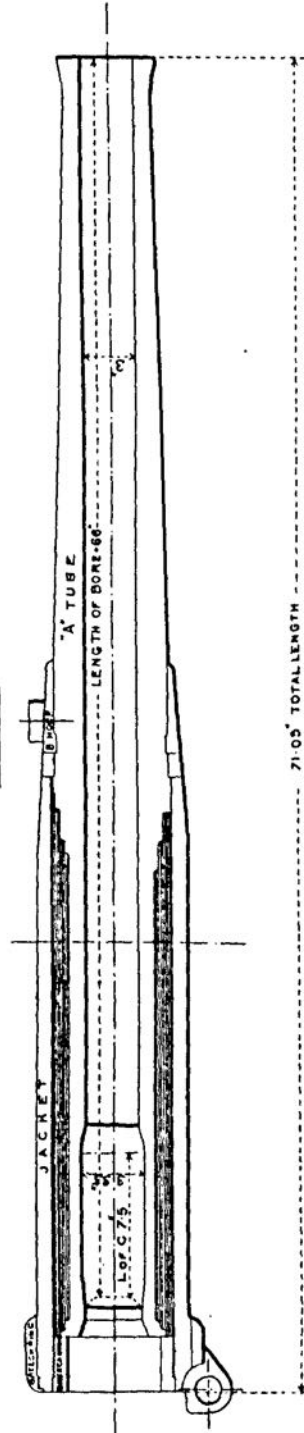
MARK III.

SCALE $\frac{1}{10}$.



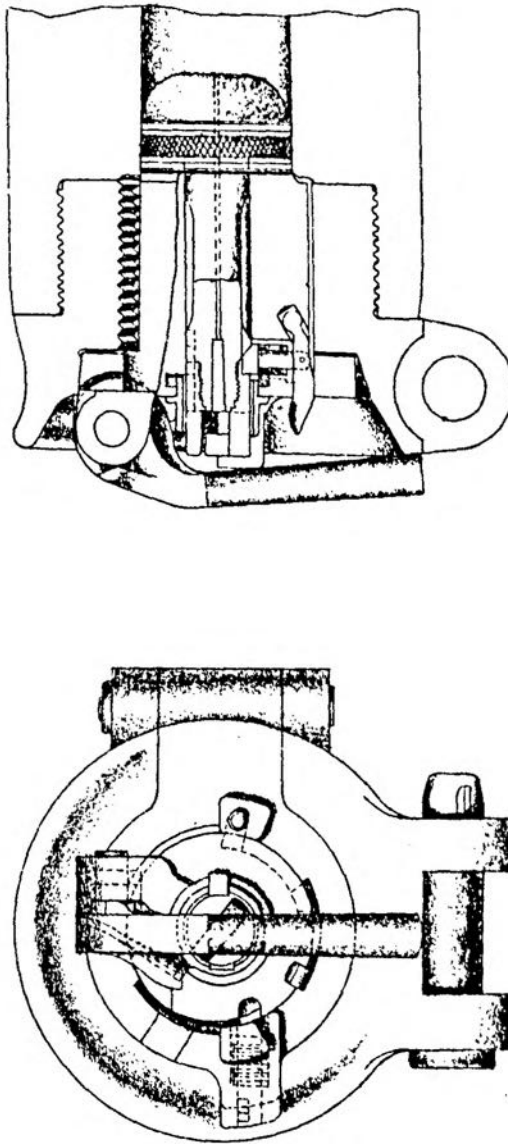
MARK IV.

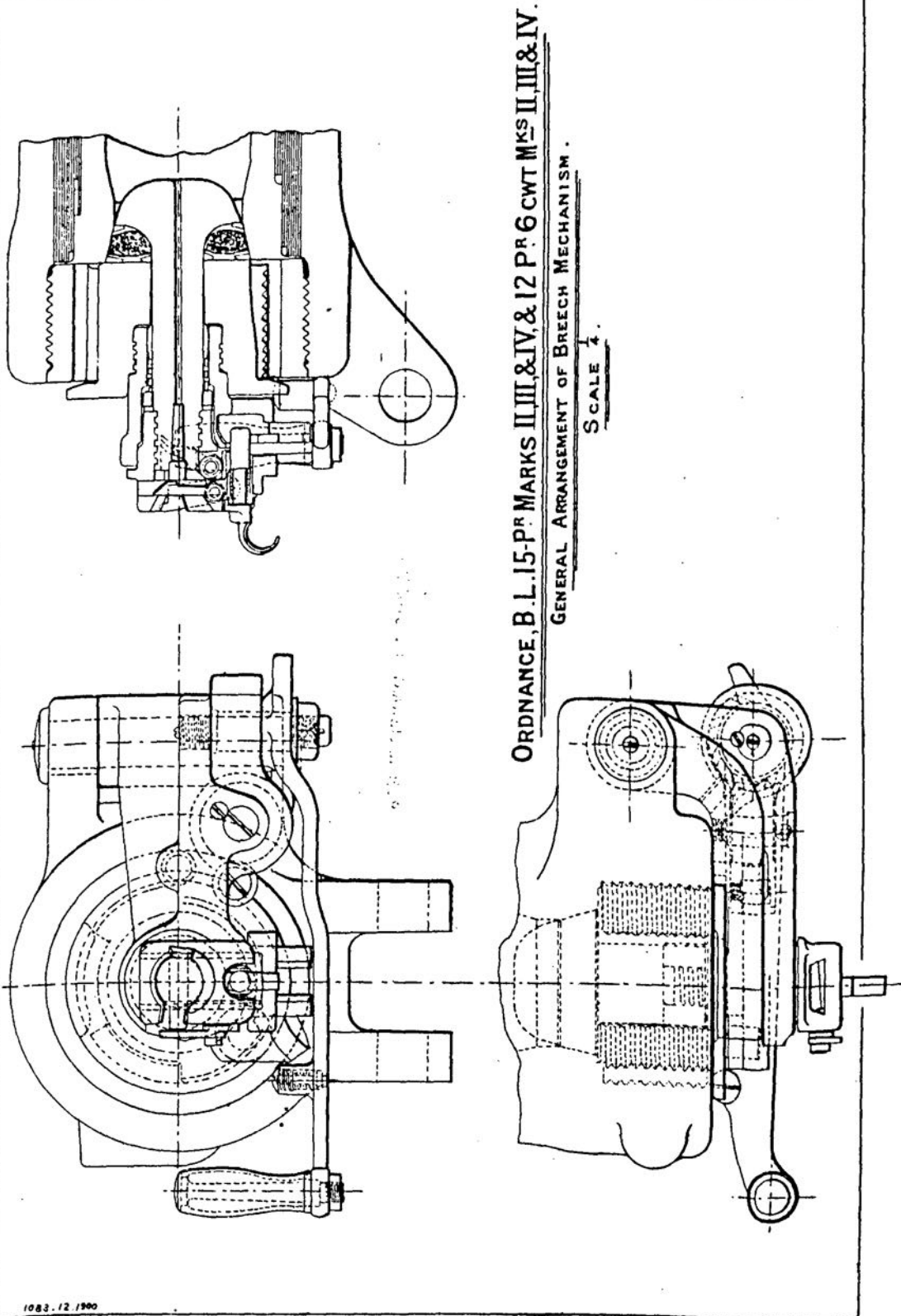
SCALE $\frac{1}{10}$.



ORDNANCE ., B. L., 12 - PR., 6 - CWT. MARK I.
GENERAL ARRANGEMENT OF BREECH MECHANISM.

SCALE $\frac{1}{4}$.



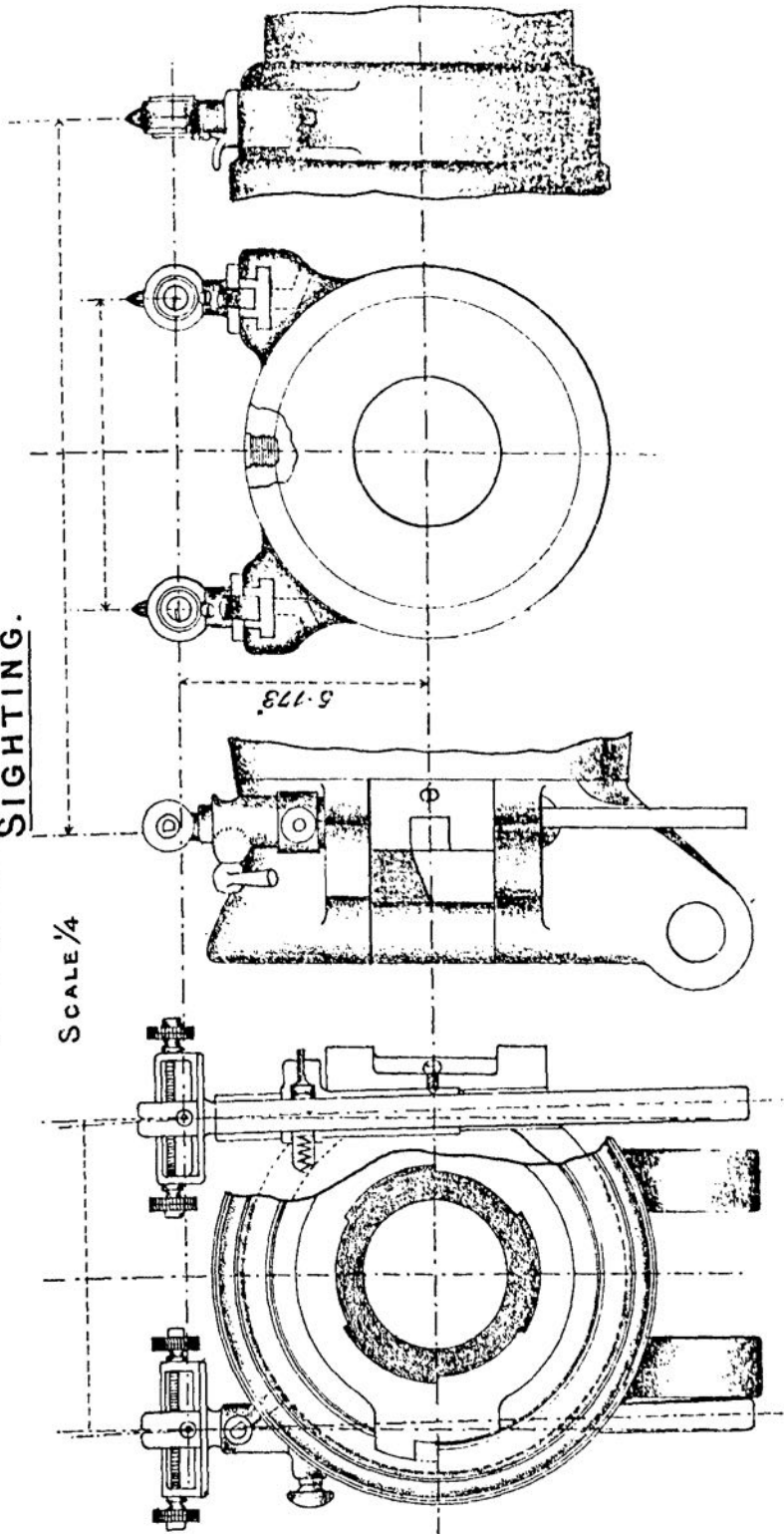


1083. 12. 1900

ORDNANCE, B. L., 12-P, 6 CWT. MARK I.

SIGHTING.

SCALE $\frac{1}{4}$

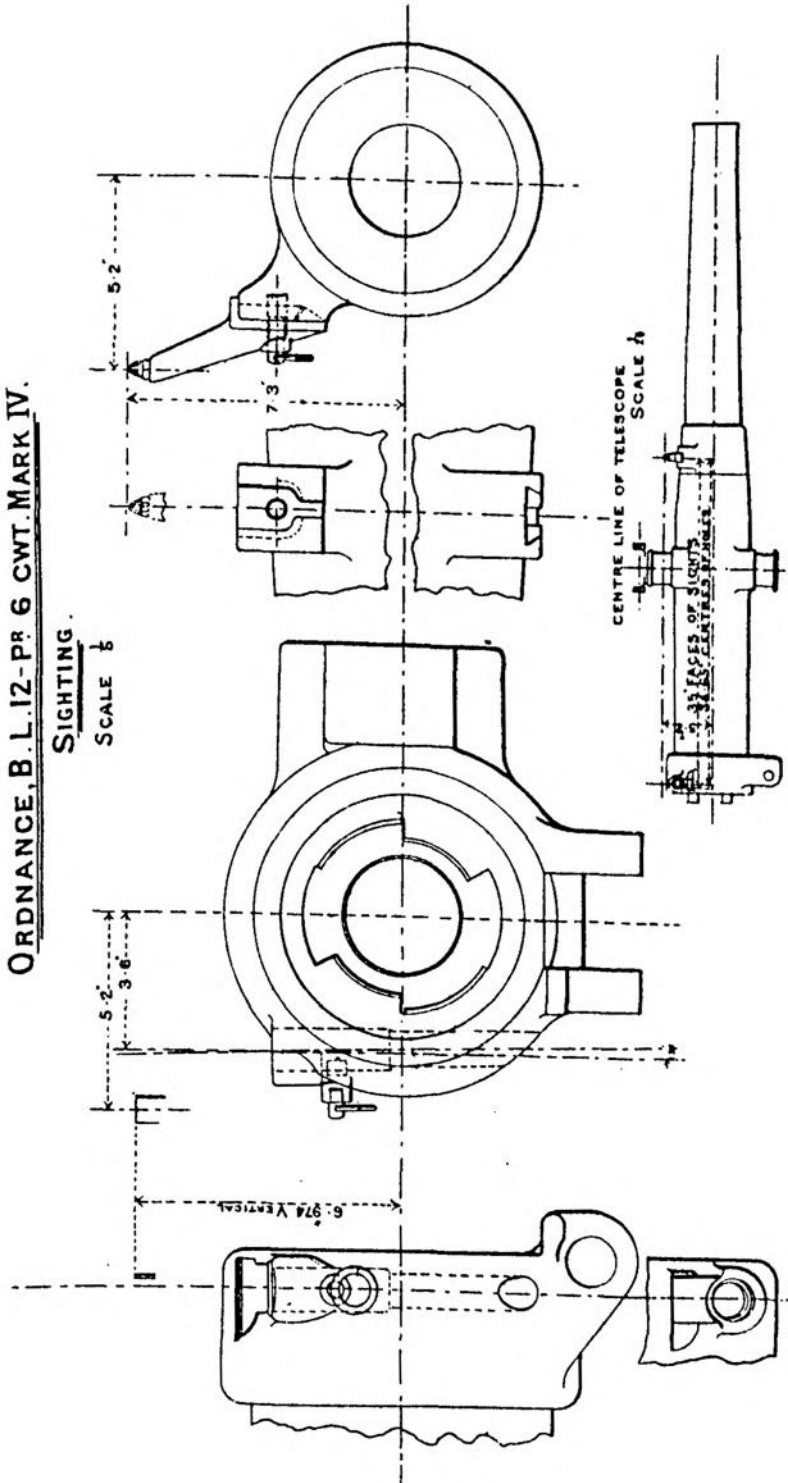


1083, 12, 1900

ORDNANCE, B. L. 12-PR 6 CWT. MARK IV.

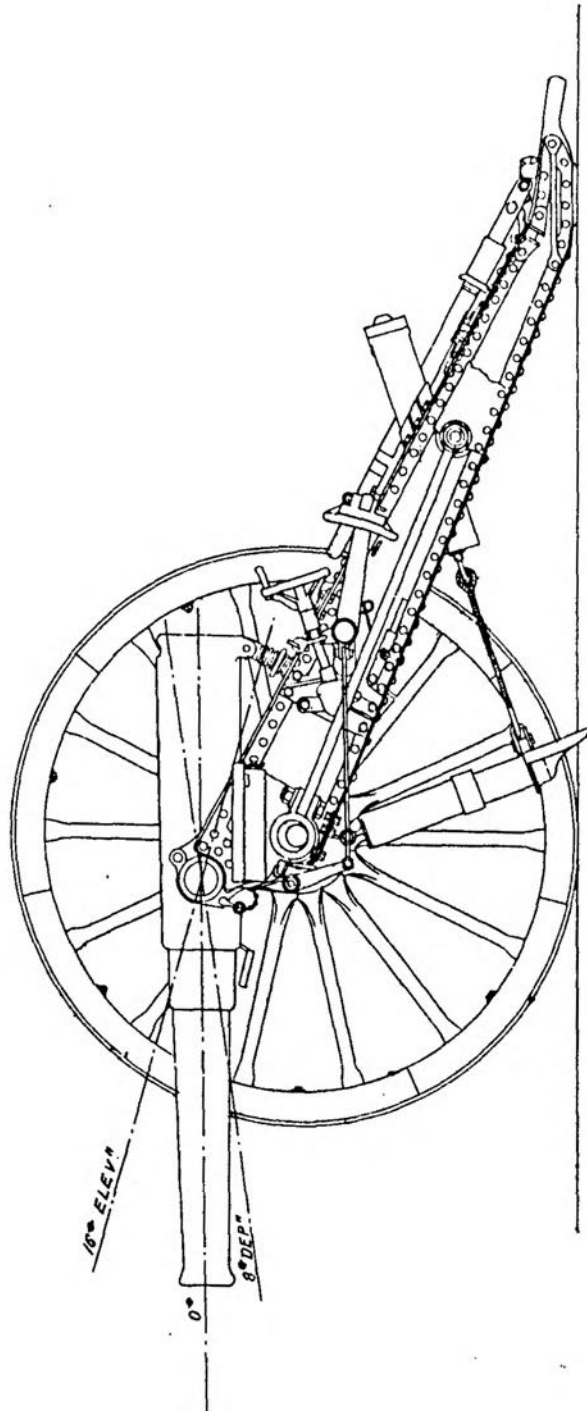
SIGHTING.

SCALE $\frac{1}{8}$



CARRIAGE, FIELD, B.L., 12P^R. 6 CWT. MARK I*

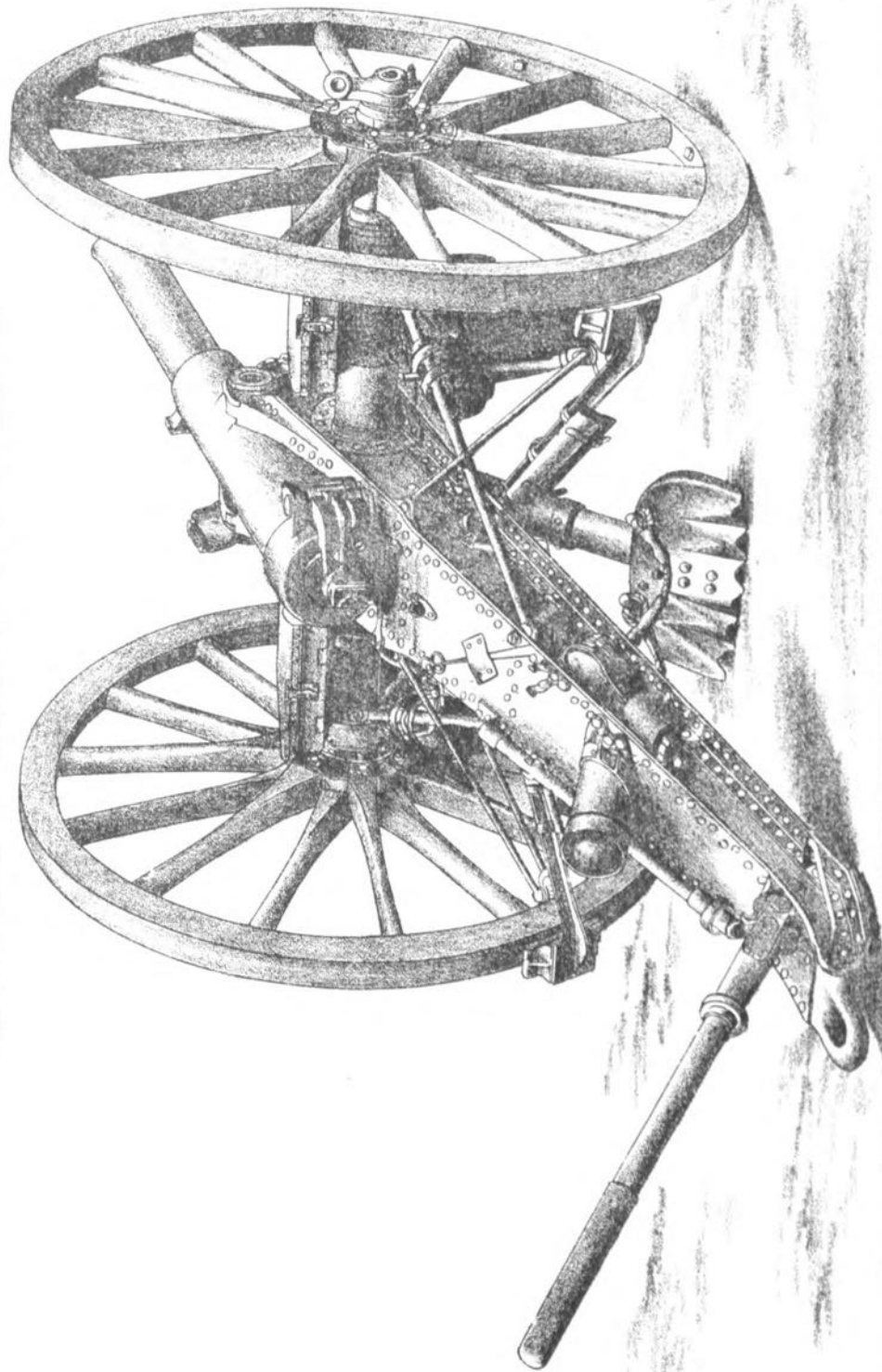
SCALE $\frac{1}{20}$.



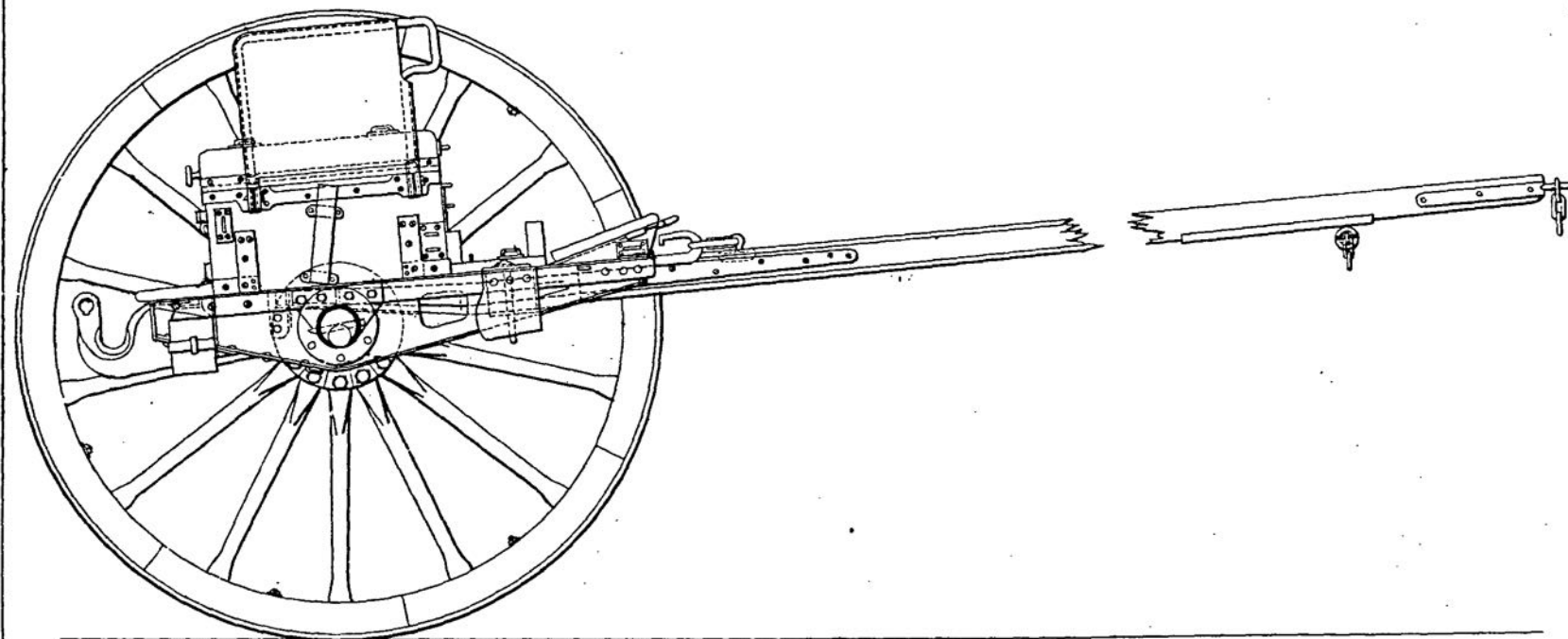
1083. 12. 1900

E. Weller & Grahams, Ltd Litho, London.

CARRIAGE, FIELD, B. L. 12 P. 6 CWT., MARK II.

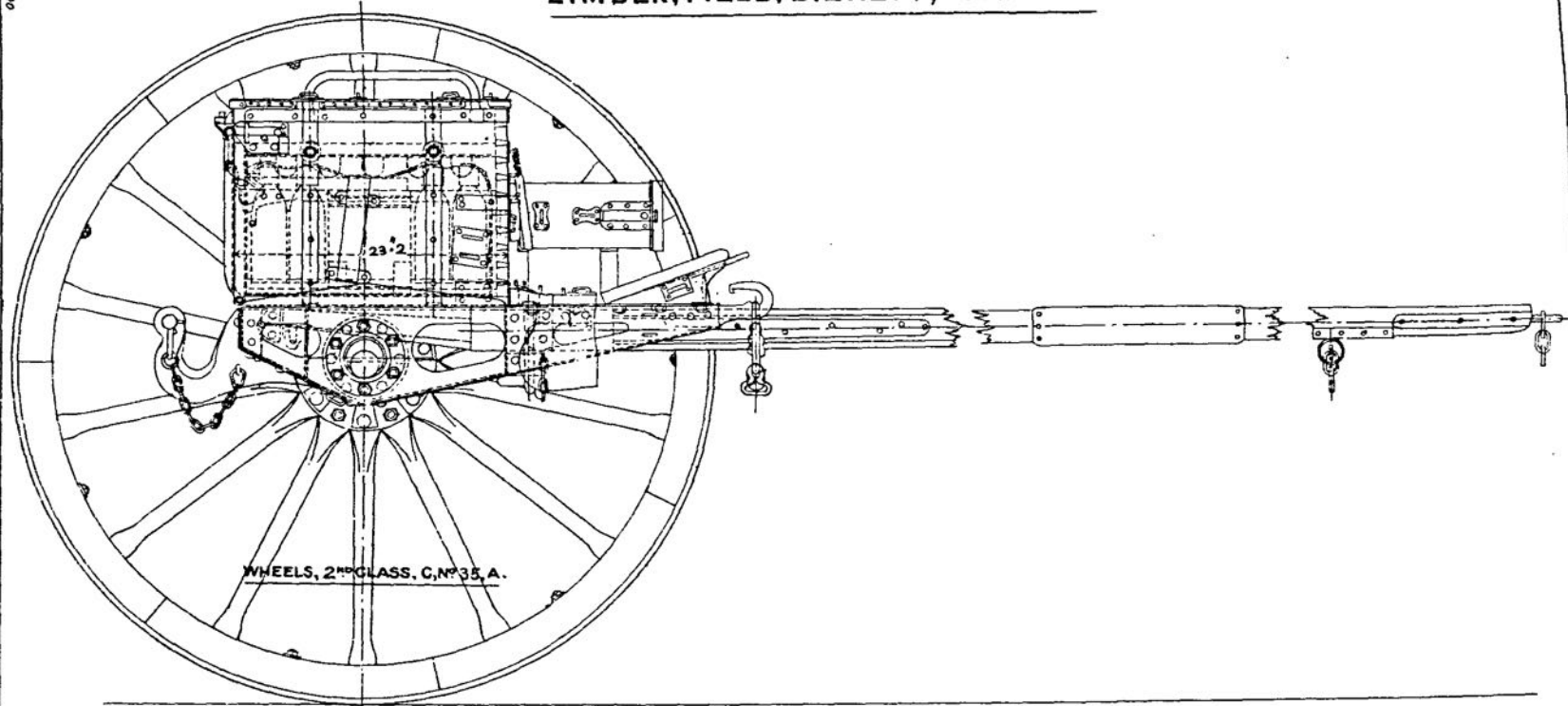


LIMBER, FIELD, B. L., 12 P^R. 6 CWT. MARK I.



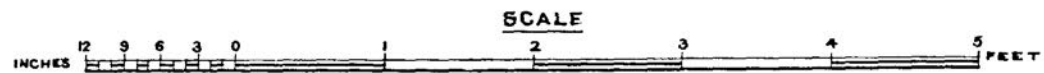
INCHES 12 9 6 3 0 1 2 3 4 5 6 FEET

LIMBER, FIELD, B.L. 12PR, MARK II.



WHEELS, 2ND CLASS, C, N^o 35, A.

SIDE ELEVATION.

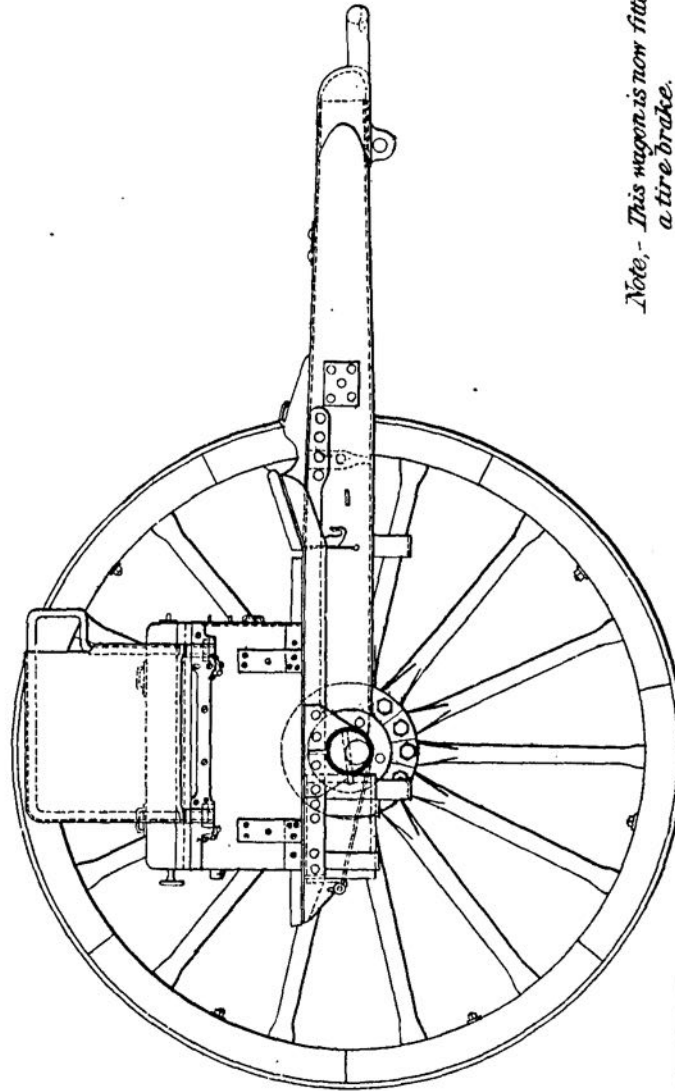


1063.12.00

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Plate X

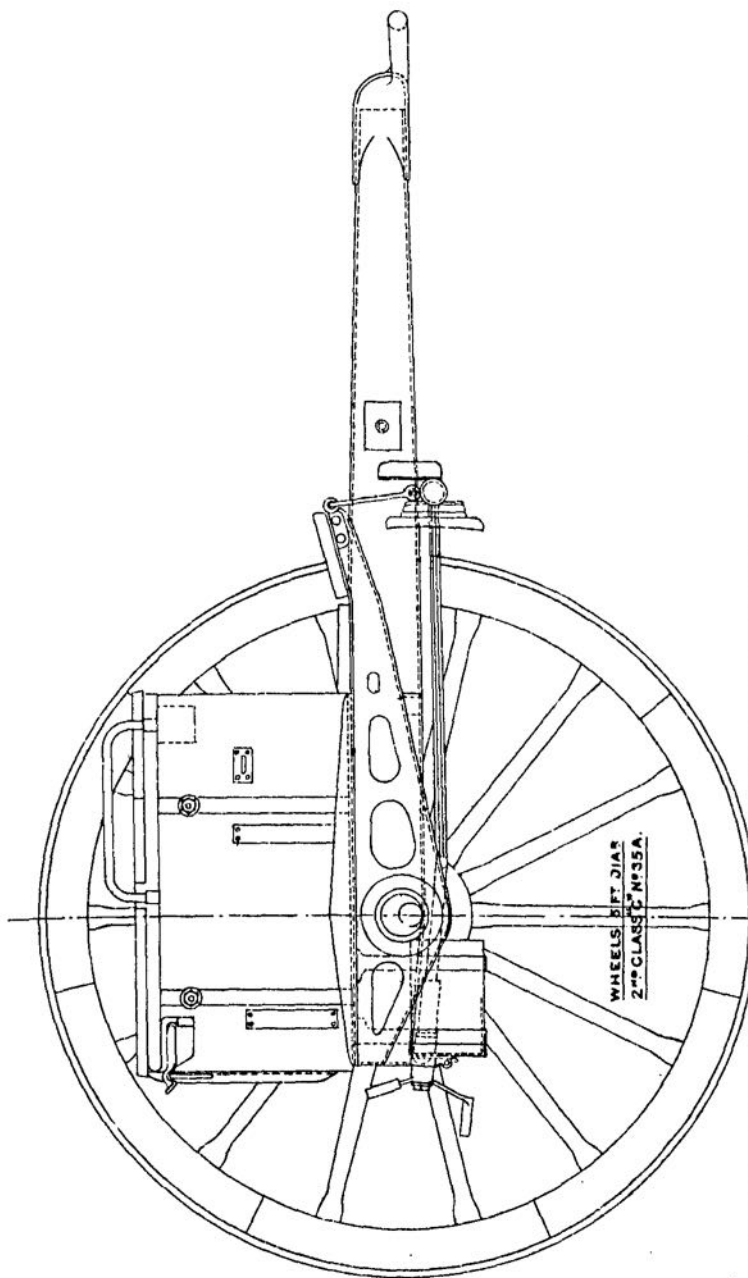
WAGON, AMMUNITION, B. L., 12 PR., 6 CWT. MARK I.



Note. - This wagon is now fitted with a tire brake.

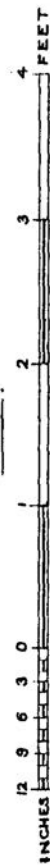


WAGON, AMMUNITION, B.L. 12 PR., MARK II.

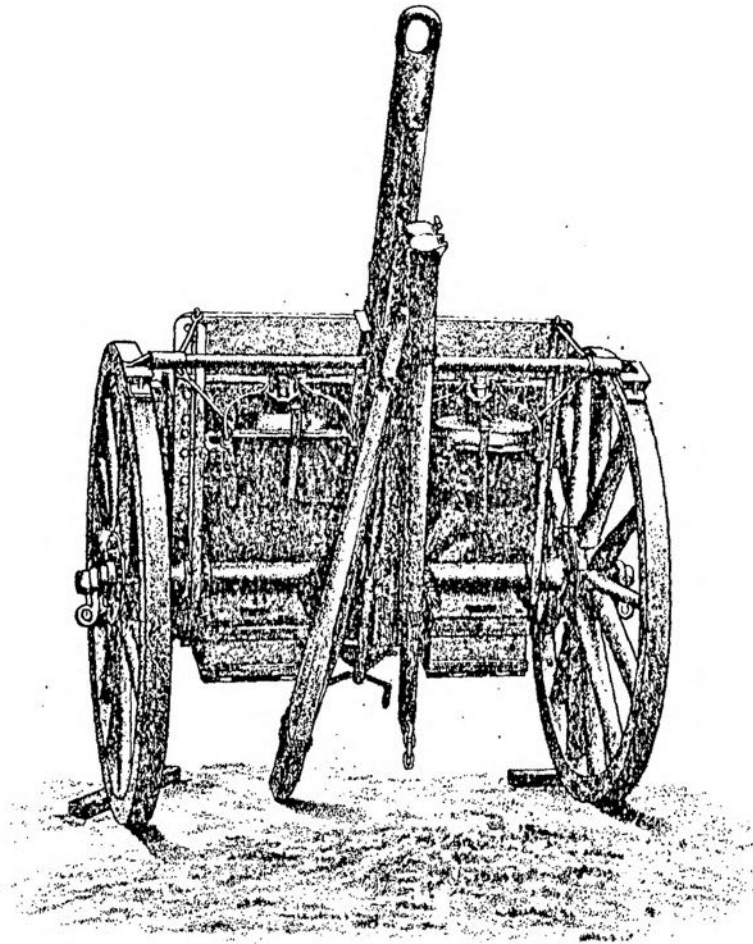


SIDE ELEVATION.

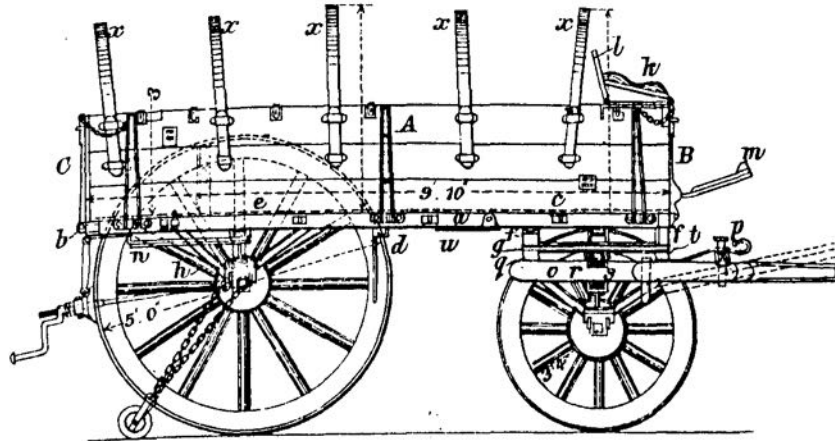
SCALE.



WAGON, AMMUNITION, B.L. 12 PR.
SHOWING POSITION OF SPARE POLE, &c

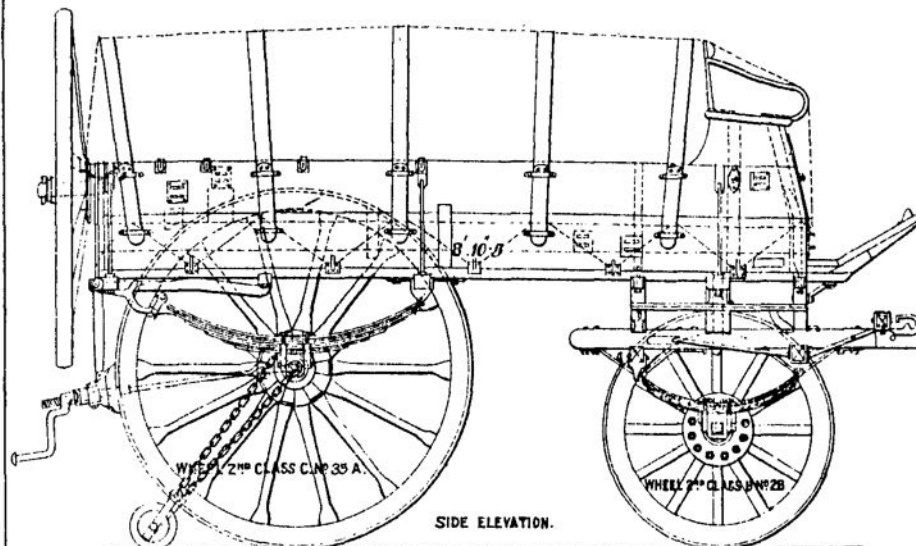


WAGON, AMMUNITION & STORE, R. A., MARK II.*



WAGON, AMMUNITION & STORE, R. A., MARK IV.

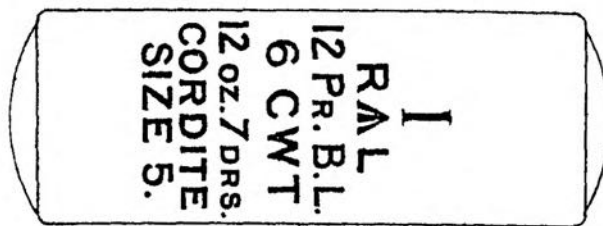
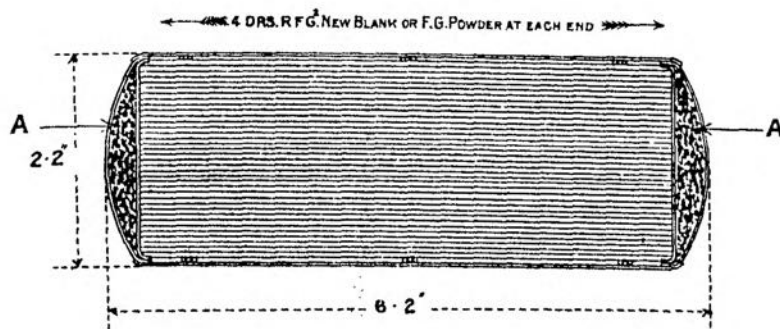
SCALE 1/32.



CARTRIDGE, B. L., 12 PR. 6 CWT. 12 OZS. 7 DRS., CORDITE, SIZE 5., MARK I.

— SHALLOON. —

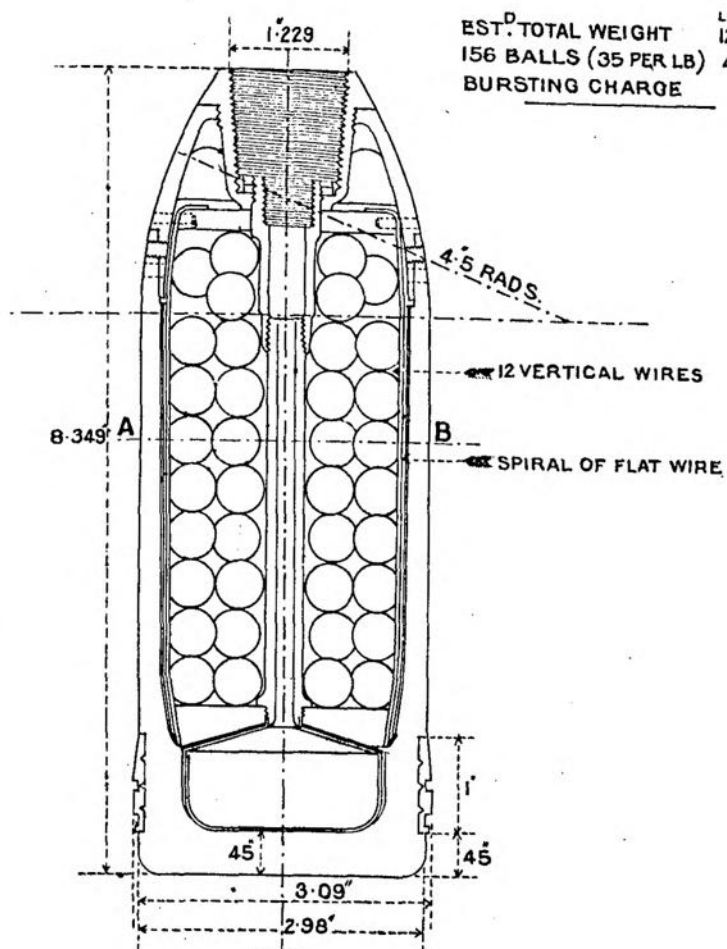
— Scale $\frac{1}{2}$. —



A. 1 DRAM GUNCOTTON YARN IN MARK II, CARTRIDGE.

SHELL, B. L. OR Q. F. SHRAPNEL, 12 PR, 12, 8 & 6 CWT. MARK II.

— SCALE $\frac{1}{2}$ —



EST. ^D TOTAL WEIGHT	LB. Oz.
156 BALLS (35 PER LB)	12-8
BURSTING CHARGE	4-7½
	1½

8-349

A

B

45

3.09

2.98

5 RADS

12 VERTICAL WIRES

~~3.3~~ SPIRAL OF FLAT WIRE

11

45

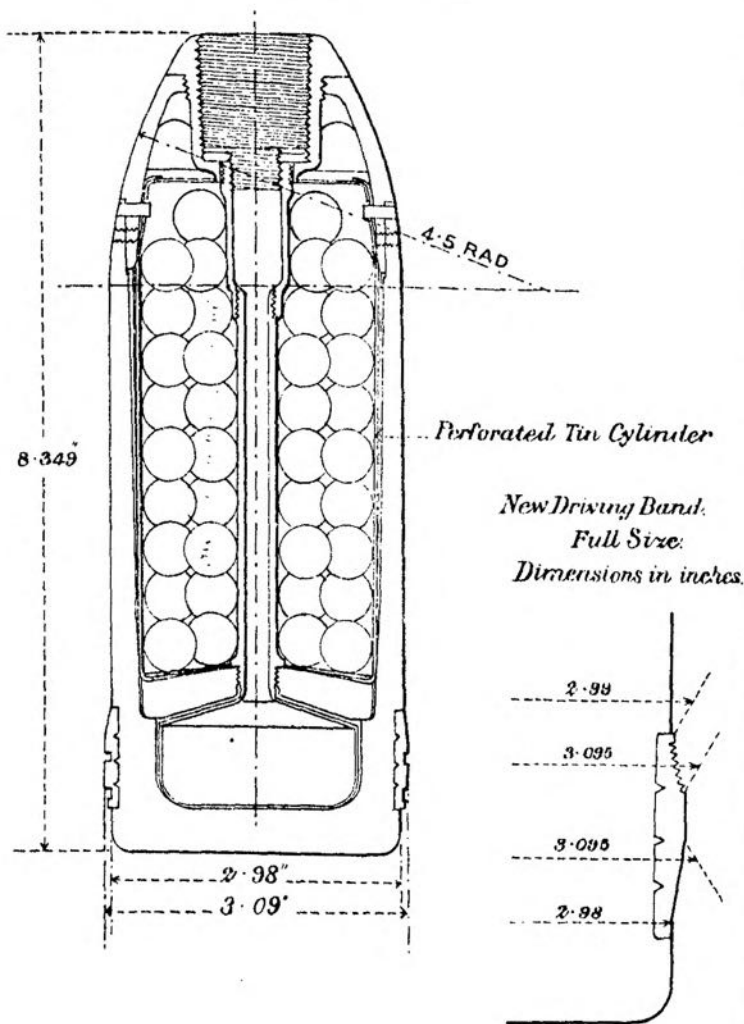
SECTION AT A. B.

SHELL, B.L. OR Q.F. SHRAPNEL 12 PR 12, 8 AND 6 CWT. MARK III-V.

FORGED STEEL

SCALE $\frac{1}{2}$

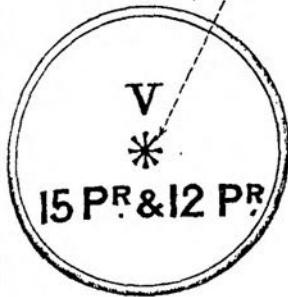
AVERAGE TOTAL WEIGHT 12 LB, 8 OZ.



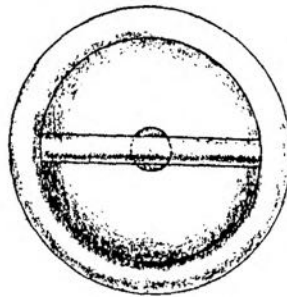
SHOT, B.L. OR Q.F. CASE, 15 PR AND 12 PR MARK V.

SCALE 1/2

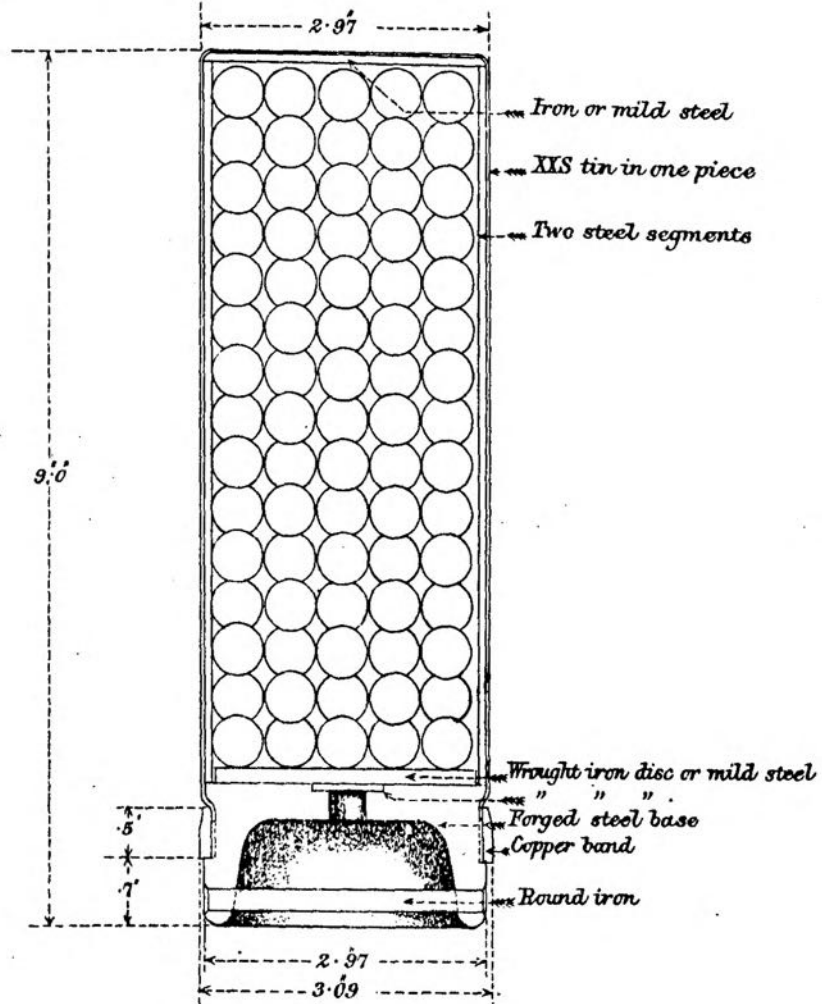
MANUFACTURERS INITIALS OR RECOGNISED TRADE MARK



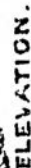
PLAN OF TOP



PLAN OF BASE



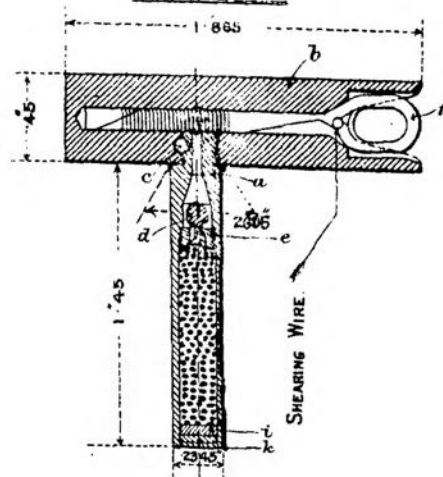
Full Size.



A. SCARLET LOOP FOR FUTURE MANUFACTURE.

TUBE, FRICTION, T, MARK III.

FULL SIZE.



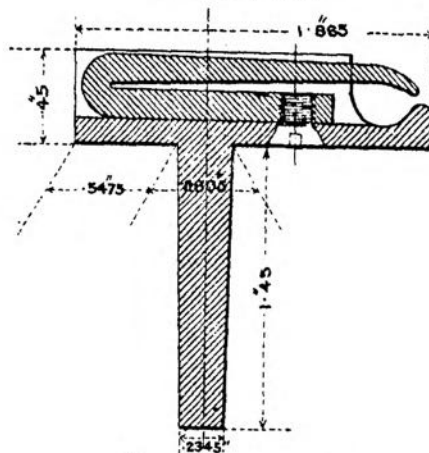
SECTION AT A.B.



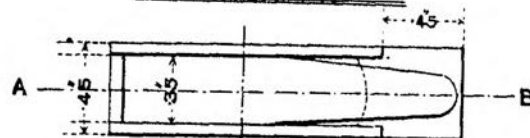
PLAN.

TUBE, FRICTION, T DRILL, MARK I.

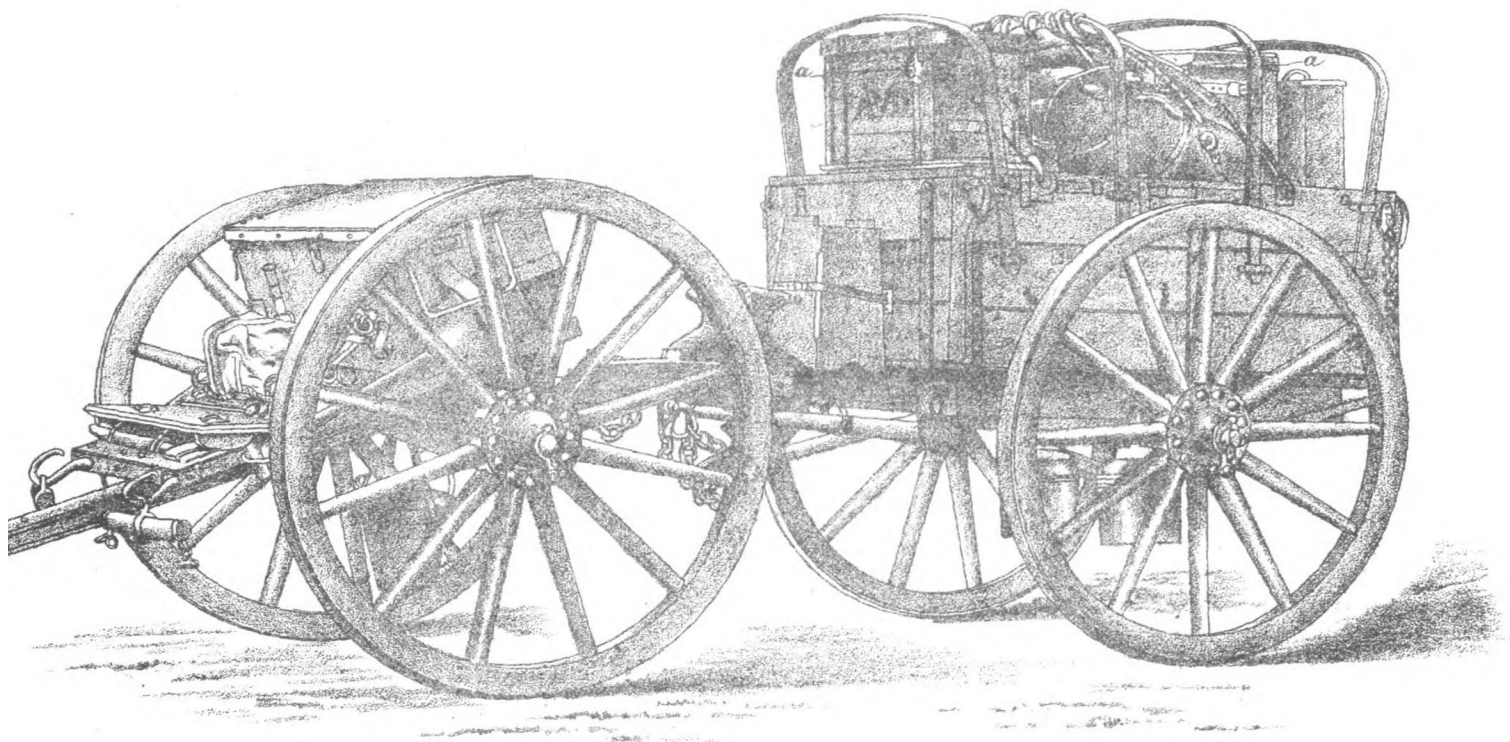
FULL SIZE.



SECTION AT A.B.

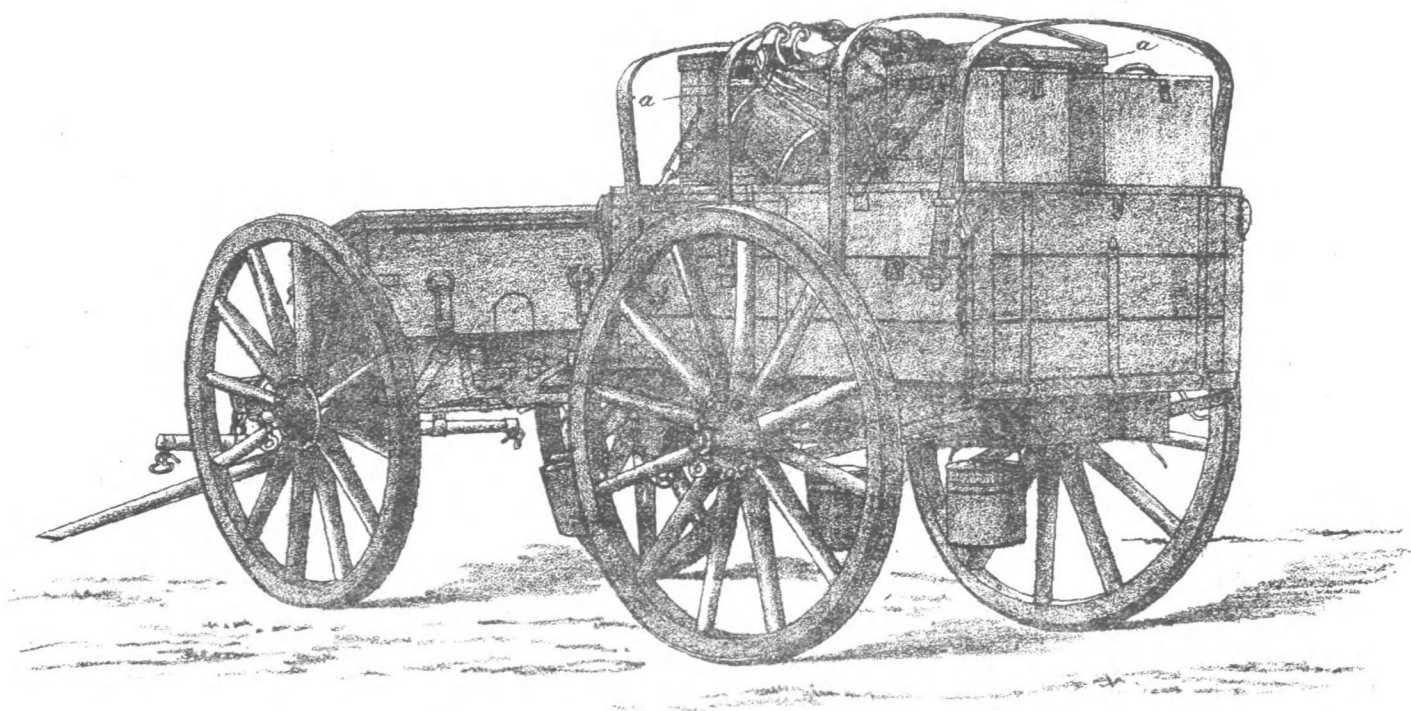


PLAN.



FRONT VIEW.

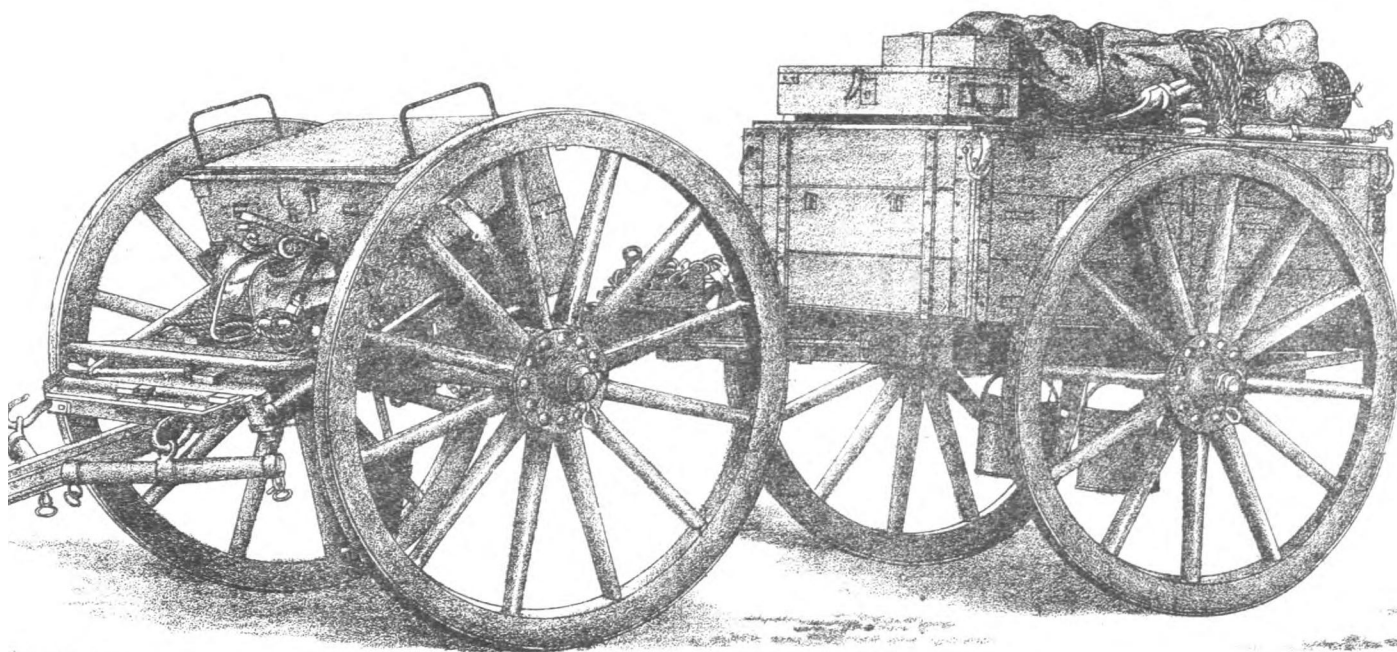
WAGON, FORGE, (MARK I*, OR II) AND LIMBER



REAR VIEW.

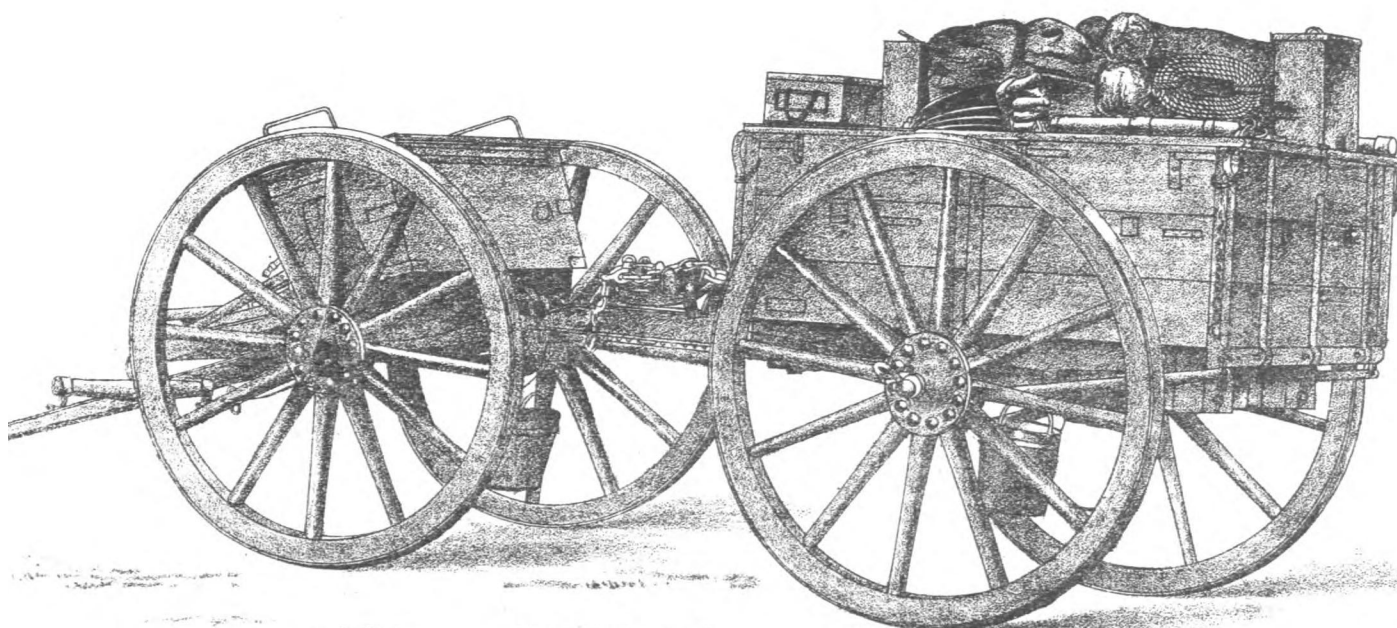
a. A "Chest, Veterinary Field, Universal pattern" will be carried infuture, in lieu of two panniers.

Note. These Wagons are now fitted with the South African Road Loe

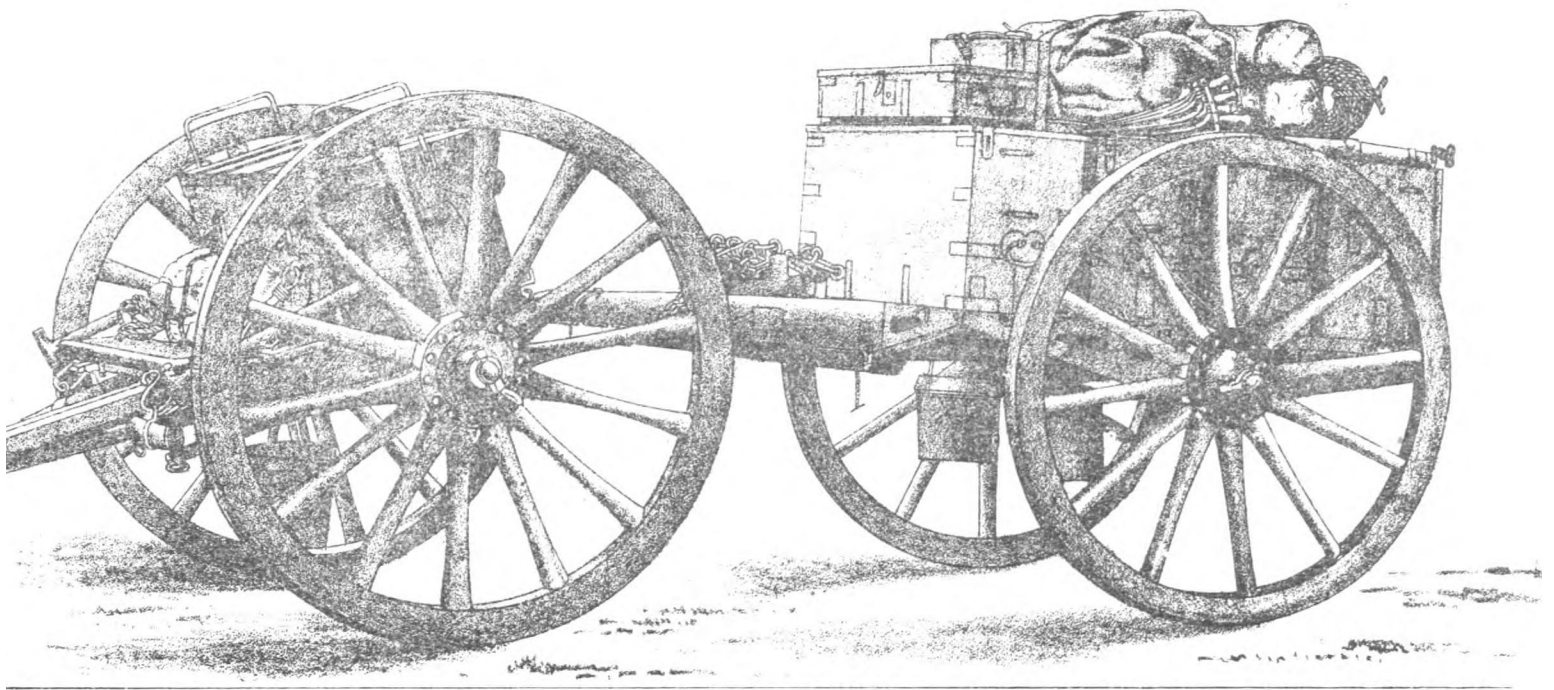


FRONT VIEW.

WAGON, STORE, R. A. (MARK I, AND LIMBER.)

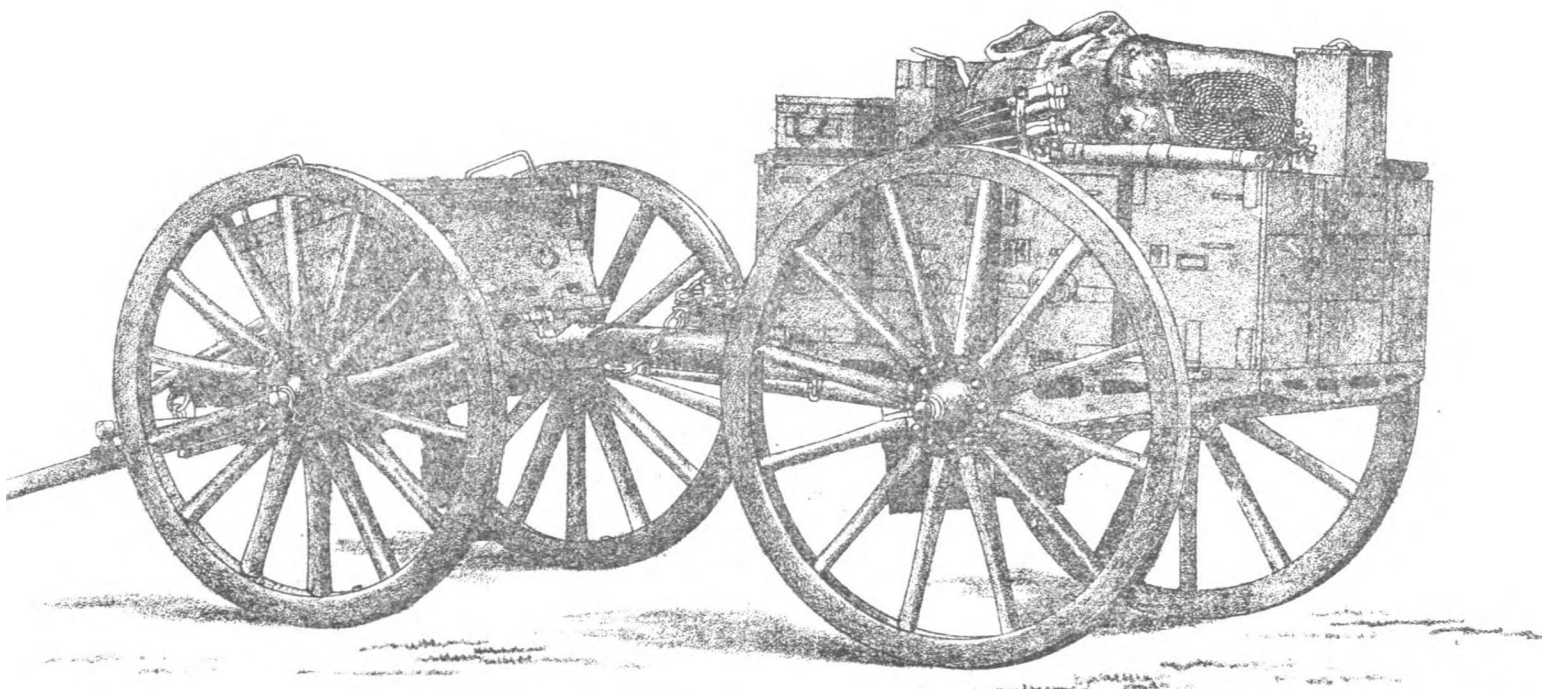


REAR VIEW.



FRONT VIEW.

WAGON, STORE, R.A. (MARK II) AND LIMBER.



REAR VIEW.